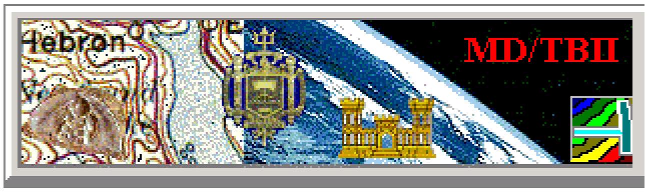
User's Guide for MicroDEM 6.0

August 2002



Microdem is written by the US Naval Academy, and distributed jointly by the Naval Academy and the US Army Engineer School at the Maneuver Support Center, Fort Leonard Wood. This user's guide was written by the Terrain Visualization Center, primary software testing and user support contact for military. Contact the TVC Webmaster and MicroDEM HELP DESK at ATZTTPIOT@wood.army.mil.

Chapter 1 Welcome to MicroDEM

Introduction

Where possible this tutorial has been written as a generic 'How-To' without reference to the specific data files being used. Many of the procedures will utilize the HangRockCanyon_DEM_2.tar.gz elevation data and Hangrock.IDX imagery data distributed with your software. These files will be located on your hard drive under the ..\Mapdata\DEMS directory and ..\Mapdata\SATS directory, respectively. Hanging Rock Canyon is located in California, near Death Valley.

Some steps will require that you use other data files. In all cases, you should be able to substitute your own data for the data files mentioned in the tutorial. Simply be sure to substitute an elevation file for an elevation file, a map file for a map file and an image file for an image file. Examples of how to work with a specific data format will of course require data files of that type.

Remember that your elevation, image and map files must have overlapping coverage and that you should always load your elevation file first. Check out the Links to Download Free Data at the TVC website:
http://www.wood.army.mil/TVC/DefaultPageContents/download_digital_data_for_free.htm.

Common File Types

The following are a few of the common file extensions and data types used in MicroDEM:
ADRG: NIMA Arc Digitized Raster Graphics scanned paper maps.
AFT: Area Feature Table for NIMA VPF data.
AVI: Microsoft Audio Video Interleave video format.
BMP: Windows bitmapped imagery.
BPW: World file for image registration for BMP files.
CADRG/CDRG: NIMA Compressed Arc Digitized Raster Graphics scanned paper maps.
CAT: Catalog file list complete coverage for NIMA VPF data.
CIB: NIMA Controlled Image Base, gray-scale imagery available in 10meter and 5meter resolution.

DEM: U.S. Geological Survey (USGS) Digital Elevation Model available in 90 meter, 30 meter and 10 meter postings. In the new MICRODEM DEM format, each DEM has a single file. In the old MICRODEM format, which is still supported, each DEM has two files, the .DEM data file and a .HDR header file.
DBF: Industry standard database table used for vector data attribution.
DIN: ASCII Index file for DEMs in a directory or series of directories.
DIX: binary index file for the DTED or GTOPO30 elevation files.
DT0: National Imagery and Mapping Agency (NIMA) Digital Terrain Elevation Data available in Level 0, 30 arc-second ~900 meter postings.
DT1: National Imagery and Mapping Agency (NIMA) Digital Terrain Elevation Data available in Level 1, 3 arc-second ~90 meter and Level 2, 1 arc-second ~30 meter postings.
DT2: National Imagery and Mapping Agency (NIMA) Digital Terrain Elevation Data available in Level 2, 1 arc-second ~30 meter postings. NIMA uses DT1 for both DTED Levels 1 and 2, but MICRODEM uses DT2 when it copies DTED level 2 to the hard disk.
DLG: USGS Digital Line Graphics vector map data.
DRG: USGS Digitized Raster Graphics scanned paper maps.
DXF: AutoCAD digital exchange files.
FLT: ASCII file with the flight path for movies.
F41/F42: Associated with US Census Bureau 1990 and 1997 TIGER vector data.
GIS: ERDAS Imagine 7.X image format
GPS: Binary file for tracks recorded with a GPS.
HDR: Old binary header file for the original MICRODEM format. The program can still read these files, but cannot write them.
ICN: ASCII file listing the locations and file names of map icons to overlay on the map.
IDX: ASCII index file for a single satellite image. This is the native TerraBase II and MicroDEM image format.
IIN: ASCII index file for the image scenes in a directory or series of directories.
IMG: A commercial geographic information system (GIS) imagery format utilized by ERDAS Imagine and the Digital Topographic Support System (DTSS) used by Army Topographic Support Terrain Teams.
LAN: ERDAS Imagine 7.X grid and image data format.
LFT: Line Feature Table for NIMA VPF data.
LL: Lat/long positions files. ASCII values.
MIC: Military icons file
MOV: Movie file, an ASCII listing of the BMP or JPEG files used to create the movie. This is not the Quicktime MOV format.
MPG: Industry standard MPEG compressed video format.
MSC: Project file used to restore analysis.
NET: Structural geology data.
NITF: National Imagery Transfer Format.
PFT: Point Feature Table for NIMA VPF data.
PLR: Pipeline route file, ASCII with the locations of the turning points of the route.
RT1/RT2: Associated with US Census Bureau 1990 and 1997 TIGER vector data.
SHP: ESRI industry standard vector data shape file.
SIN: Vector map SIN files, single precision reals with coordinates.
TDW: ASCII datum file to go with the TFW world file. Contains the datum, UTM zone, and hemisphere.
TFW: Geotif World Files are often associated with some tiff files and carry the geo-location information required for using the imagery in a GIS system.

TGT: Target location. Used with a target approach movie to toggle on and off the location of the target in the center of the screen. This is an ASCII file stored in the \MapData\Movies directory.
TIF: Industry standard geo-referenced GEOTIF files with/without .twf world file.
TOC: Commonly associated with the area table of contents A.TOC file for NIMA Controlled Image Base (CIB) and Compressed Arc Digitized Raster Graphics (CADRG) data.
XY: imagery registration file

Additional Training Materials

Video Battle Drills are available for previous and current versions of the software. Most of the functionality and menu structure remains the same for versions 5.03 5.1 and 6.0. These movies show how to access new functions available in each version of MicroDEM.
Download from **http://www.wood.army.mil/TVC/DefaultPageContents/MicroDEM_TBII.htm.**

Installation

You may download the full installation program from the Fort Leonard Wood web site at http://www.wood.army.mil/TVC/MicroDEMV6/microdem_ver_60.htm.

Installing MicroDEM is accomplished by simply running the installation program and following the instructions. You'll be asked to provide the drive ID and path for installation if you don't wish to use the default C:\Program Files\MicroDEM-TBII and C:\Mapdata directories. The Mapdata directory is used for data output and file conversion and should therefore be placed on a drive or partition with a large amount of free space. The MAPDATA directory must also be at the root level of its drive, and you must have write permission if you place it on a network drive.

Upgrading

If you have installed a previous version of TerraBase II or MicroDEM you will need to download the new installation file for MicroDEM 6.0. Subsequent upgrades will be released as full installations and as replacement executables. Once you have installed an earlier version in the MicroDEM 6.0 series you may upgrade to the latest version by downloading the replacement executable from the Fort Leonard Wood site. This .exe file should be placed in your MicroDEM directory. Since the file name will be different from the original MicroDEM.exe you'll need to create a new shortcut from your desktop to the new executable.

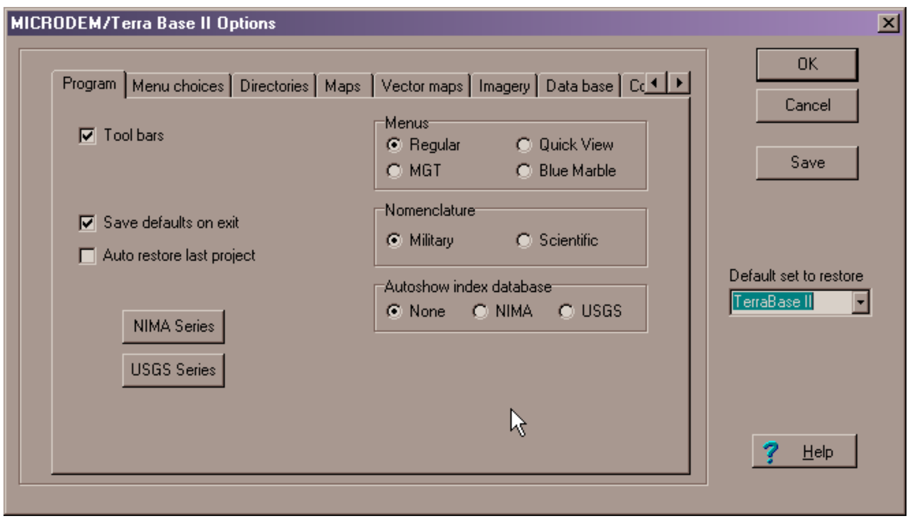
To create a new desktop icon right-mouse click on your desktop and select NEW and SHORTCUT. In the Create Shortcut window click on the <BROWSE> button and navigate to your MicroDEM directory, select the file name of the new .exe file and click on <OPEN> <NEXT> and <FINISH>. The new MicroDEM icon will now appear on your desktop → 

Program Navigation

In this tutorial, words in < brackets> refer to toolbar or dialog window buttons. Main menu, drop down menu and pop-up menu commands such as FILE / OPEN DEM are in all caps. Titles for checkboxes and other options are <u>underlined</u>. Descriptive titles are shown in ‘semi-quotes’. All mouse clicks are left mouse clicks unless otherwise stated.

Setting Options

Before you start using MicroDEM you must set your software defaults. This will insure that you are using the same menus, settings and datums as other users. Army personnel and users of this tutorial should set their software defaults to TerraBase II by selecting OPTIONS/DEFAULT SET TO RESTORE/TERRABASE II then hit the <OK> button and exit the program. Exiting the program and restarting will insure that these configuration changes are saved even if you later encounter a bug or error in processing. Using the save button will also immediately save your current settings.



You may fine tune any of the settings available under OPTIONS but be careful; many of the settings will affect the size and /or resolution of your resulting products. Some options such as your PRIMARY DATUM, will critically affect the accuracy of your coordinates. Be certain your Global Position System (GPS) receiver, all maps products and your software are all set to the same datum.   You should be using WGS84 unless you have specific and compelling reasons to pick another datum.

Starting the Program

a. Double-click the desktop icon → 

b. If you do not have a desktop icon, select START/ PROGRAMS/MicroDEM-60**.** The actual group-name will depend on the directory name you chose while installing MicroDEM.

c. If you want to create a desktop icon simply right click on your desktop and select NEW / SHORTCUT. This will bring up the Create Shortcut pop-up window. Click on the <BROWSE> button and navigate to the location of the MicroDEM.EXE file under the directory where you installed MicroDEM.

MicroDEM HELP

Information on the operation of MicroDEM and many related subjects such as remote sensing, geology, micro-paleontology, hydrology, et cetera may be accessed through the built in HELP function by clicking HELP at the main menu.

Main Menu and GUI Buttons

MicroDEM 6.0 is designed like most current Windows programs with a Main Menu and pull-down sub menus such as FILE / OPEN DEM.

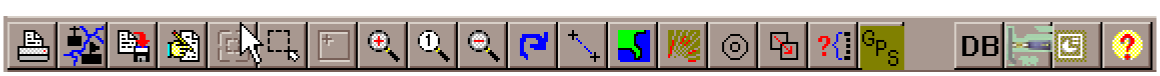
Note: The layout of your main menu will vary depending upon the OPTIONS you've selected, the type of data you are displaying and which child-display you currently have highlighted. Your menu will change while you are working with MicroDEM, but don't let this confuse you. Some functions are available for maps, other functions are only available for imagery and some will only be available if you have both your elevation data and image/map data loaded.

Many of the common menu functions will also be available from the graphic user interface (GUI) buttons located beneath the Main Menu. For simplicity, we will use the toolbar for most of the MicroDEM applications in this tutorial.

If you allow your pointer to rest on an button while moving your mouse across the GUI buttons you will get a small button title or 'hint' describing the function of that button. Note: As you open files, more buttons will appear and/or activate otherwise they may be grayed-out and inactive. You can also turn off some of the more "exotic" program functions using the last tab on the defaults form invoked with the options menu choice. If you cannot find a function that you know should be available, check what might be disabled on this form.

Child Display GUI Buttons and Options

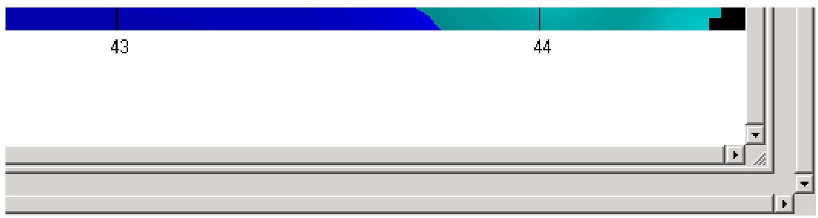
Individual elevation, image and map displays will each have their own GUI button menu bar. You can right click your mouse on many of the displays to get additional options. These options are also available in the Main Menu. You may find you prefer to right click on your display to access some functions, especially if your image or map is too small to allow access to all your child display's GUI buttons.



Note: Not all display toolbar button functions will be available at all times for all data types. Some buttons may be grayed-out or may be missing depending on the type of data you are displaying and the type of display window you are using.

Display Slider Bars

Most windows will have slide bars, indicating the image is actually larger than the current display. You can use these slide bars to display the unseen parts of your image. If you have enlarged your display to larger than the original MicroDEM window and then move the secondary display you can wind up with a double set of slide bars, as seen below, which may at first be confusing. One set is for the individual map display window, and the other is for the entire desktop.

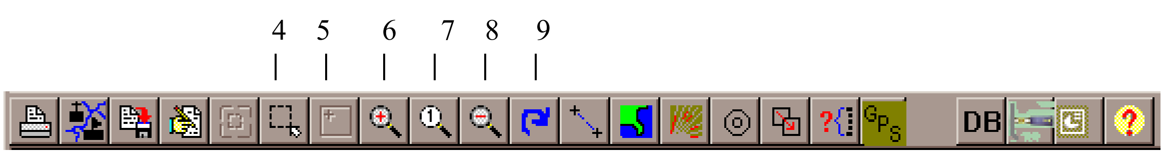


Resizing Your Display

You can resize a window, to avoid using multiple slide bars, by right clicking on either edge or the tab at the bottom right corner and dragging while holding down your mouse button. This is allows you to adjust the size of your window so you can see the marginal data and/or all your GUI buttons for each display.

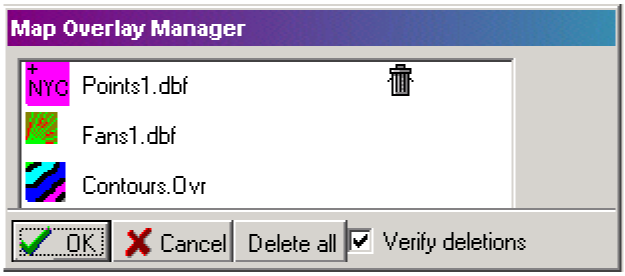
Zooming In/Out and Window Subsets

MicroDEM offers a <Subset&Zoom> button 4 <Center Map> button 5, <Zoom–In> button 6, <Zoom 1:1> button 7 where one screen pixel equals one ground pixel, <Zoom-Out> button 8, a limited Undo feature <Force Redraw> button 9 and other options to customize your display of windows and files. See the **Basic Operations** section for more information on modifying the screen.



The Overlay Manager

Individual raster overlays, which you have created, may be manually sorted or deleted using the OVERLAY/OVERLAY MANAGER. The order of overlays in the Overlay Manager reflect the stacking or drawing order on your display. If one of your overlays is obscuring another simply click on that overlay and drag it to a new position in the stack. To delete a single overlay simply click on it and drag it to the trash can at the upper right corner of the manager window.



NOTE: If you only have a single overlay you will not get the pop-up Map Overlay Manager, you will simply be asked if you wish to delete the single overlay.

General Program Tips

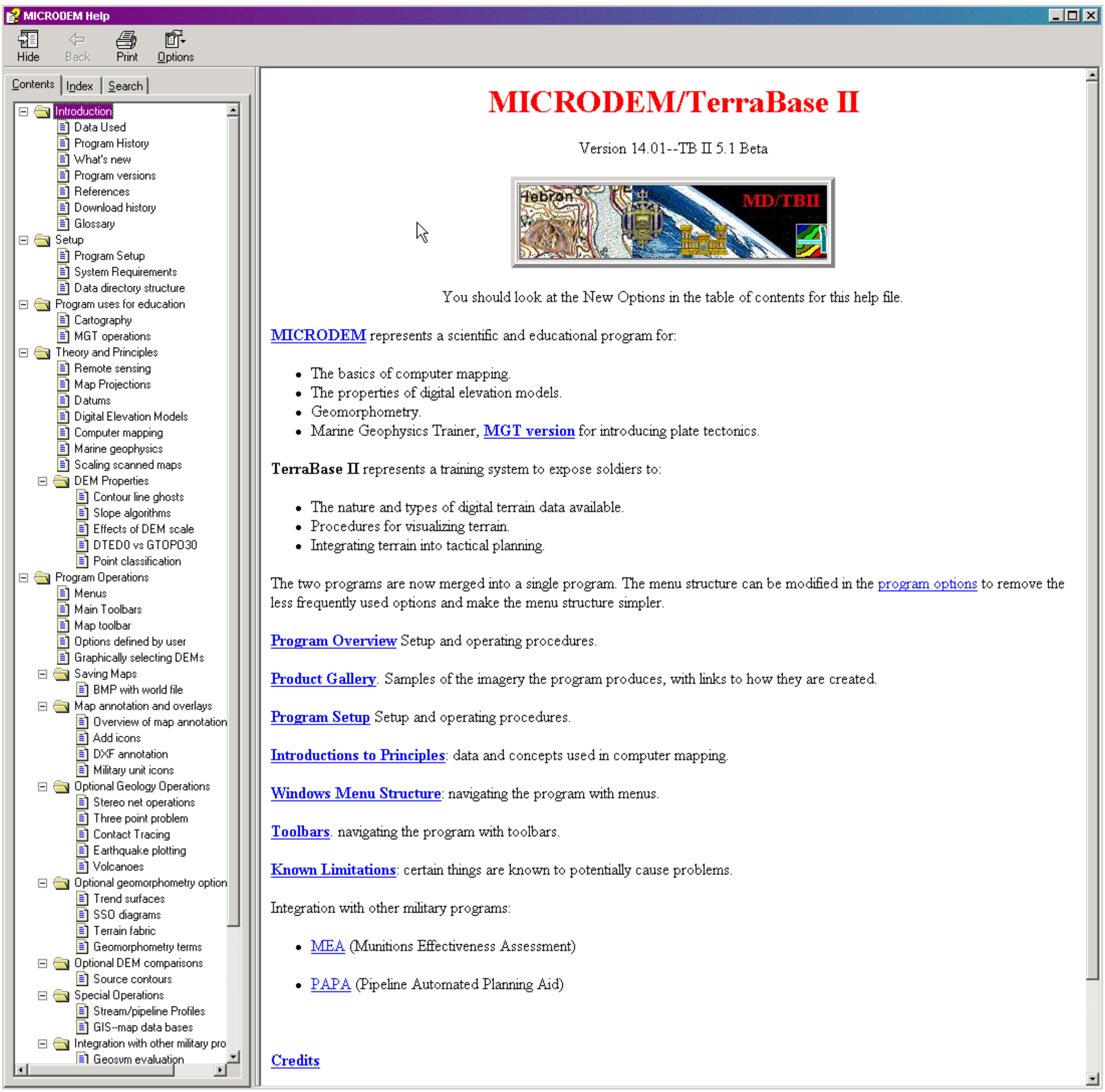
The status bar at the bottom of the screen will display useful information. This includes:

- The action the program is expecting of you is displayed in the left-most panel.
- The current coordinates and elevation in the second panel.

MicroDEM Help Files

MicroDEM has a **very** comprehensive Help File. Any questions you have concerning the operation of MicroDEM should first be researched here.

This Help file also offers an extensive set of educational sections on the theory and principles behind geographic information systems, terrain visualization and related sciences to include: Remote Sensing, Cartography, Map Projections, Datums, Elevation Models, Computer Mapping, Marine Geophysics, Geology, Micropaleontology and more.



It is well worth your time to peruse the MicroDEM Help file… who knows, you may learn something interesting that you weren't looking for.

Chapter 2 Basic Raster Operations

Open an Elevation Data File

DTED or Digital Terrain Elevation Data is a National Imagery and Mapping Agency (NIMA) product ordered through your supply system and the Defense Logistics Agency. DTED Level 1 files are available for a large part of the world and have elevation postings of three arc seconds or approximately 90 meters. DTED Level 2 files are available for more limited areas and have elevation postings of 1 arc second or approximately 30 meters. To find out how to order NIMA data check out the following URL: **http://www.wood.army.mil/TVC/DefaultPageContents/ordering_nima_data_through_dla.htm.**

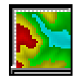
DEM or Digital Elevation Model is a US Geological Survey product ordered through USGS. Check out the USGS web site **http://www.usgs.gov/**. DEM files are available in 90 meter, 60 meter, 30 meter and 10 meter elevation postings for the United States. To locate free samples of USGS and other data check out: http://www.wood.army.mil/TVC/DefaultPageContents/download_digital_data_for_free.htm.

Note: To open a NIMA DTED elevation file, you will need to know the latitude and longitude of the desired location. You can find them on the corners of a map or in the NIMA hardcopy or digital catalogs. If you have MGRS or UTM coordinates and need to convert them to Lat/Long coordinates see the section on Coordinate Conversion in **Chapter 6**. NIMA DTED files are located in directories named by longitude and subdirectories named by latitude. The file coverage is based on one-degree cells, approximately 60 nautical miles or 111 kilometers on a side. Each file of DTED Level 1 is approximately 2.9Mb in size and is found by the longitude and latitude of the SW corner.

USGS DEM elevation files usually have quadrangle-map names and you'll need a catalog, overview display or other listing to figure out which file you need. Download sites usually have overview map imagery that you can download to assist you in determining the proper DEM files to download.

You can also use the local database functions to organize your data files, and allow graphical selection using a map.

As an introduction to using elevation data we'll simplify the procedure by simply opening the Hanging Rock Canyon elevation file distributed with MicroDEM.

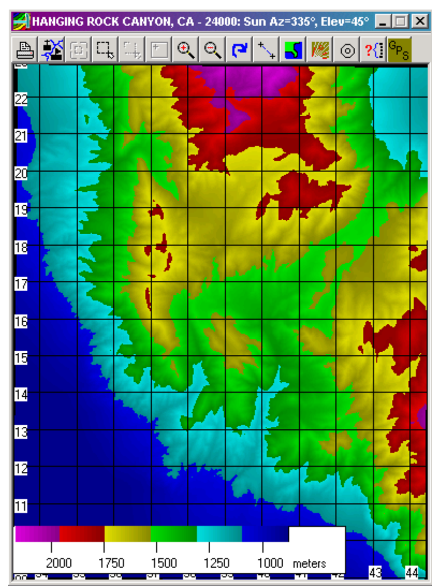
Select the <Open DEM> button → 

In the Open New DEM window navigate to the drive where you placed your Mapdata directory ..\Mapdata\DEMS. You may need to insure that they Files of Type box at the bottom says any likely dem or all files to find a .dem file. Open the file **HangRockCanyon_DEM__2.tar.gz**.

Note: The .tar.gz file is a compressed file format commonly used for distribution on the Internet. MicroDEM automatically decompresses such files for your use. Older USGS DEM elevation files often have a .DEM extension (newer ones consist of about 18 files with DDF extensions) and normal NIMA DTED files have a .DT1 extension.

Unless you've changed the default setting under OPTIONS/MAPS/DEFAULT DISPLAY a grayscale reflectance map will be drawn.

TIP: You will probably need to resize the window in order to see the marginal data displayed on bottom. To do this, use your mouse to grab the bottom edge of the Elevation Map window and pull it down. Take a minute to orient your self to the display.

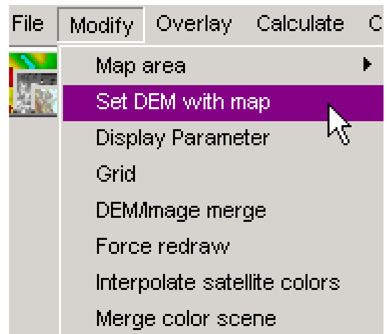


A shaded relief or reflectance map, as shown on the left, is generated with shadows to simulate an aerial image. See **Chapter 2** Modifying Display Parameters of Elevation Data. Instead of the reflectance map, on the Maps tab of the options form you can select an elevation tint map as the default display.

The six-color display, as shown on the right, is created by distributing the six main colors in the legend at the bottom from the highest to lowest elevation within the DEM. Each elevation file will have its own color shading. **Very important** - blue does **NOT** necessarily represent water but rather the lowest elevation range. In the margin of your display you should see a grid-coordinate and legend as shown above.

LOOK at the bottom of your main MicroDEM window and you'll see the current coordinate position of your mouse pointer, elevation reading (Z value) and horizontal datum. The default coordinate is in MGRS, elevation is in meters and datum is in WGS-84, but you can change each of these factors in the OPTIONS Menu.

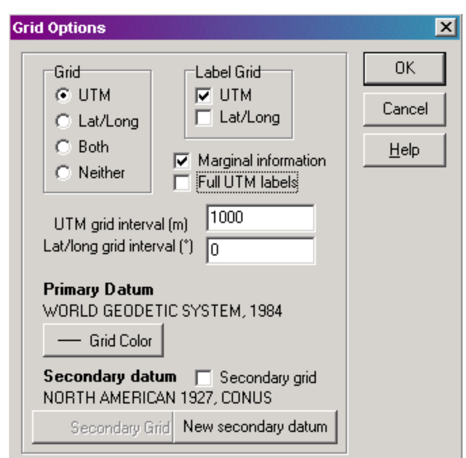
NOTE: Previous versions of TerraBase II and MicroDEM required that you first open your elevation data BEFORE you opened your image or map data. This would automatically associate the image or map with the elevation data so that you could perform analysis and create 3D products. Now you can load the elevation data after the image or map and associate the two by clicking on your image or map to highlight its title bar then selecting MODIFY / SET DEM WITH MAP.



Altering the Grid Overlay

Your display will initially appear with only the primary grid overlay. If you are displaying a military map it will have its own grid so you will not need to overlay another grid unless the original map is on a different datum. You can display both your primary and secondary datum grids and latitude/longitude tics or you may elect to turn off your grid overlay for certain cases such as when viewing scanned military maps which will have their own grid. The primary datum is black (by default) in color and will match the default datum listed in the margin of the window. In this case, the primary datum and grid display will be in WGS-84. The secondary datum, in this case North American Datum 1927, will appear by default as a red grid. You may alter the grid overlay by right clicking on your display and selecting GRID to bring up the Grid Options window. Click on the <Grid Color> and <Secondary Grid> buttons to change the colors of your primary and secondary grids.

Using the Grid Options window you may elect to remove the marginal area around your data display. The margin holds the UTM and Lat/Long coordinate text and the Legend information specific to your display. Once you've selected the changes to your grid overlay click on the <OK> button to redraw your display.



Changing Coordinate and Elevation Readout Displays

To change the Coordinate Readout Display: 

Select **OPTIONS/UNITS**. You can display the coordinates of the current position of your mouse pointer in Military Grid Reference System (MGRS), Short MGRS as shown above, Universal Transverse Mercator (UTM) or in Latitude/Longitude. Under <u>Locations</u> select the radio button next to the desired display type <u>Latitude and Longitude</u> then under <u>Lat/Long</u> select the radio button for <u>Decimal Seconds</u> then click <OK> button to close the MicroDEM/TBII Option window.

The coordinate readout will change as soon as you return to the map.

To change the Elevation Reading display:

Select **OPTIONS/COORDINATES** and check the <u>Dual Elevations</u> to display your z values in both meters and feet then click the <OK> button. The elevation display changes as soon as you return to the map.

Changing Primary and Secondary Datums

Regional horizontal datums, such as North American Datum 1927, reference all locations from a point on the surface of the ellipsoid and are accurate only for that region. Global horizontal datums such as WGS-84 are earth centered and accurate for locations world-wide.

Select **OPTIONS/MAPS** then click on the **<**PRIMARY DATUM**>** button to open the <u>Default Local Datums</u> window. In this window you may select from a large number of world-wide horizontal datums. MicroDEM defaults to WGS-84, the DoD standard. To change primary datums search through and highlight the desired datum. Select NAS-C, North American Datum 1927, CONUS then click on the <OK> button.

NOTE: If you have any displays open, they will remain in their existing datum, but all new files (DEM, satellite, and map) will open in the new datum.

To prove this point open a second HangRockCanyon_DEM_2.tar.gz file by selecting the <OPEN DEM**>** button. Note that your initial DEM display is in WGS-84 and your new DEM display is in NAS-C datum instead of WGS-84. This datum change shifted the grid lines approximately 200m to the north.

The secondary grid may be changed by selecting OPTIONS/MAPS/ and clicking on the <SECONDARY DATUM> button to open the <u>Default Local Datum</u> selection window. Again highlight the desired datum and close by clicking on the <OK> button.

NOTE: Before continuing it is recommended that you switch your datums back by repeating the previous steps, selecting WGS-84 as your Primary Datum and NAS-C as your Secondary Datum.

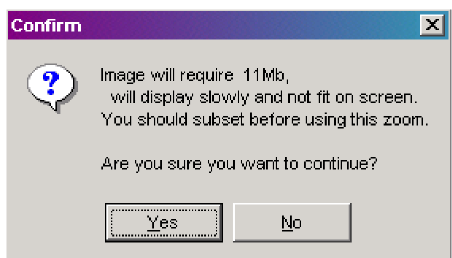
The whole purpose in having multiple grid overlays on your display is to provide a method of correctly referencing coordinates on your display when working with other equipment or maps which are utilizing other horizontal datums. Ideally you should have all your equipment and maps on a common datum such as WGS-84.

Modifying the Display

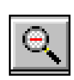
Remember almost anything displayed on the screen can be modified by using the tool bar, the command line, and/or right clicking the display itself.

Zooming In. Select the <Zoom-In> Icon → 

NOTE: As you zoom in MicroDEM extracts more data from the data file taking up more of your computer's RAM. It will warn you if the RAM requirement begins to increase. Every computer will behave differently depending on the available amount of RAM and virtual drive space. Each type of data behaves differently depending on resolution and color depth. As you gain experience you should make note of how much you can zoom-in on your computer for each type of data. If you push the limits too hard the software will crash and you'll have to start over.



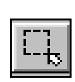
If you need to really zoom in on one area, it is wiser to first subset the area, then zoom in to use less memory (covered in the next section under Window Sub-setting).

Zooming Out. Select the <Zoom-Out> Icon → 

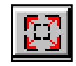
Zooming out is straight-forward and represents no limitations other than the fact that your display window may become too small to properly display all your GUI buttons. Don't worry; all of the GUI button functionality is available by right clicking on your display or from the MAIN Menu.

Window Sub-setting.

Often your initial display will cover too large an area for practical use. To view your specific area of interest (AOI) without zooming-in and worrying about RAM limitations simply perform a window subset.

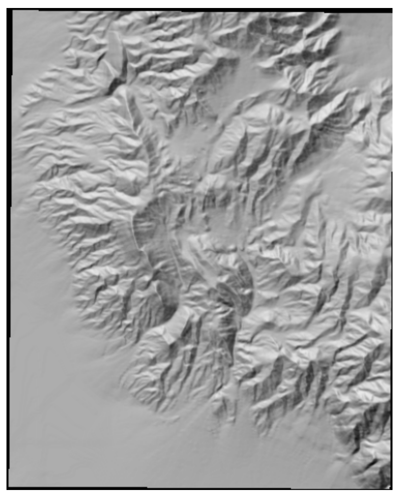


Select the <Subset & Zoom> icon →
To select the area to subset left mouse click and hold your mouse button on the upper left hand corner then drag the box border down to your lower right hand corner and release. A new window will appear with the smaller area.

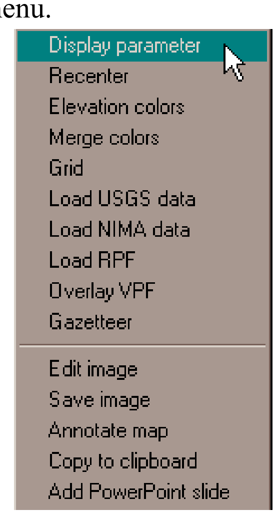
To restore your original display select the <FULL DATA SET> button → 

NOTE: You can also permanently subset areas for repeated use. This procedure will be covered later in Section 9, "Data Manipulation".

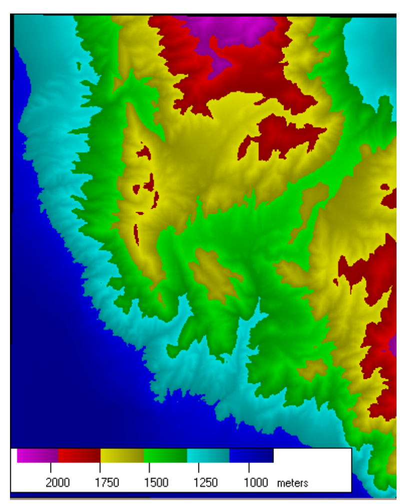
Modifying Display Parameters of Elevation Data



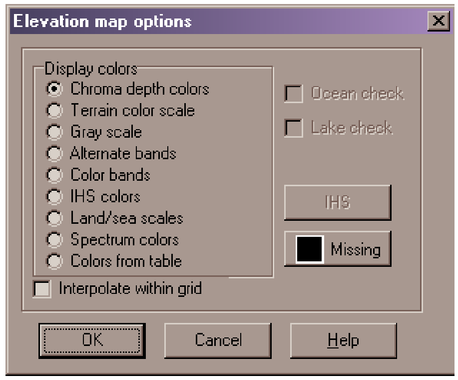
Elevation data may be displayed in several different ways. By default your elevation data will be displayed as grayscale reflectance map unless you've changed the default setting under OPTIONS/MAPS/DEFAULT DISPLAY. To bring up your Display Parameter menu simply right mouse click on your elevation data display and select Display Parameter from the initial menu.



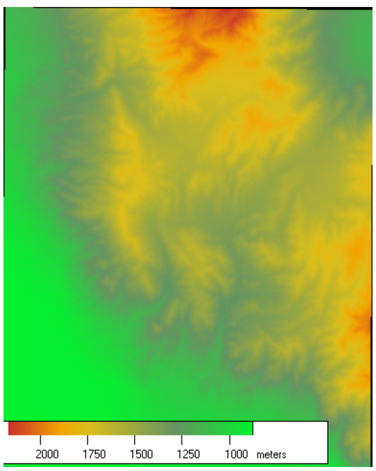
→



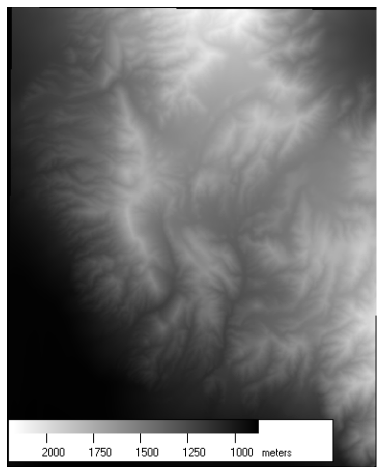
Elevation: The current window shows the six-color 'Elevation-Tint' color scheme also known as the 'Default Rainbow Colors'. These colors are selected to give the best 3D shift when wearing ChromaDepth™ 3D glasses. To change the color scheme of the elevation display tint, right click on the window and select one of the display colors from the menu. Here you may select from seven different color schemes.



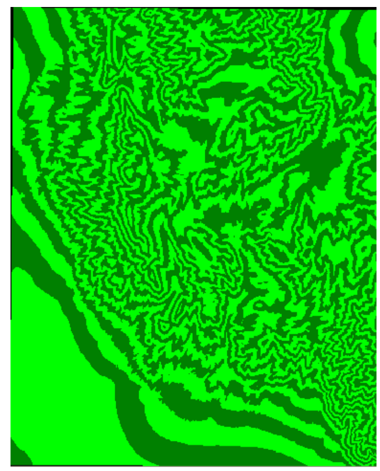
NOTE: The <u>Interpolate within grid</u> checkbox is used to smooth-out the pixels after you've zoom-in or performed a window-subset.



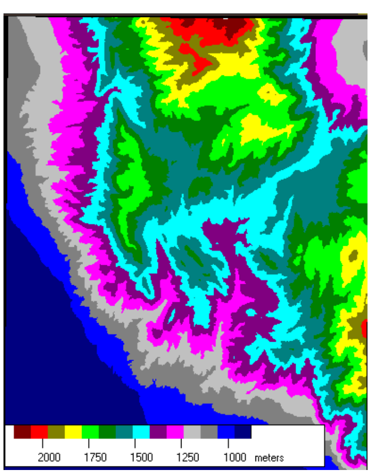
Terrain Color Plot



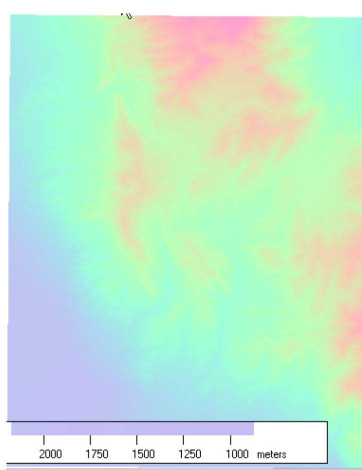
Gray Scale Plot



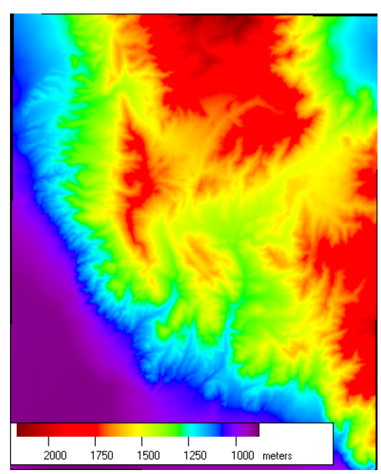
Alternate Bands Plot



Color Bands Plot

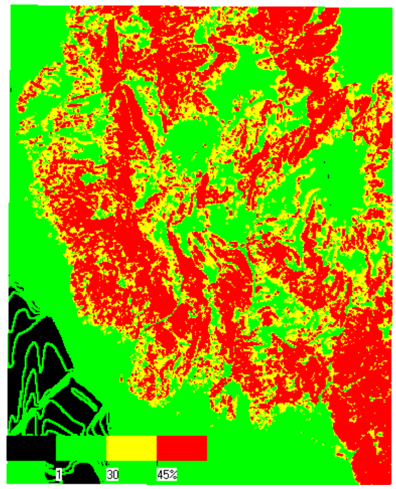


I.H.S. Colors Plot



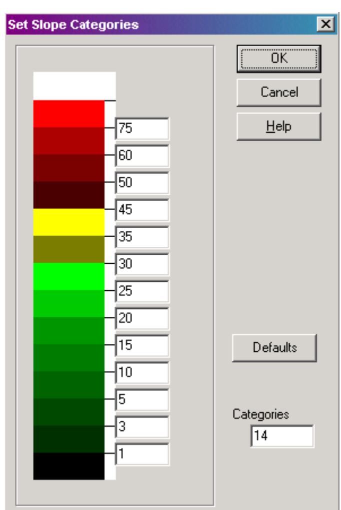
Spectrum Colors Plot

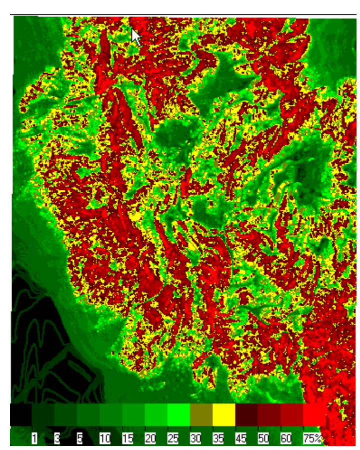
Slope/Cant: Mobility analysis plots are called slope plots. Artillery analysis plots are referred to as cant plots. This function produces a display which represents the four slope categories, <1%, 1-30%, 30-45% and >45% of the NATO mobility model. This is often called a Trafficability plot and is used in assessing cross-country mobility. The legend for the category colors can be found at the bottom of the window.



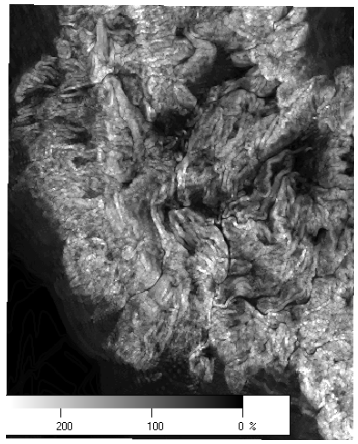
Right click on the display and select Standard from the five available slope plot options on the pop-up menu. This will allow you to customize your slope plot by setting slope ranges and colors for fourteen different categories.

The Set Slope Categories pop-up window will allow you to edit the number of categories, the range for each category and the associated color. Accept the given display for now and click the <OK> button. The display is now broken down into more categories and the new legend can be found at the bottom of the window. See the Slope Maps section in **Chapter 7**.

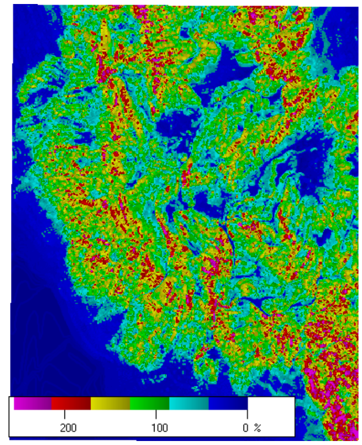




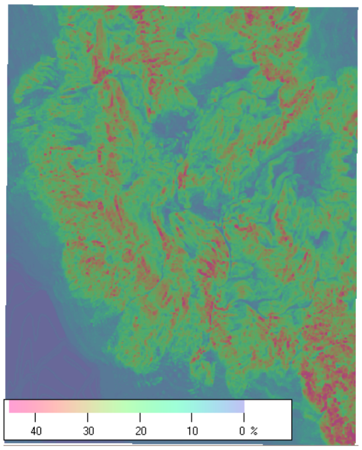
Other available slope displays include :



Gray Scale Slope Plot



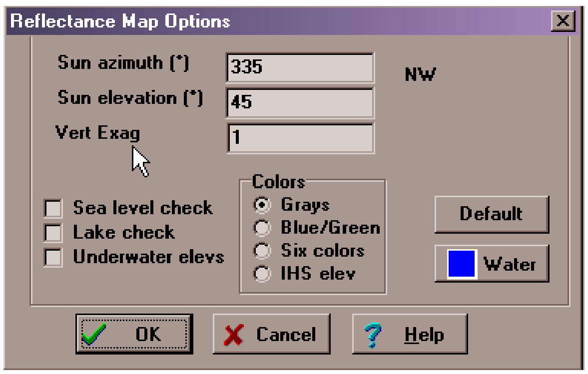
Rainbow Slope Plot

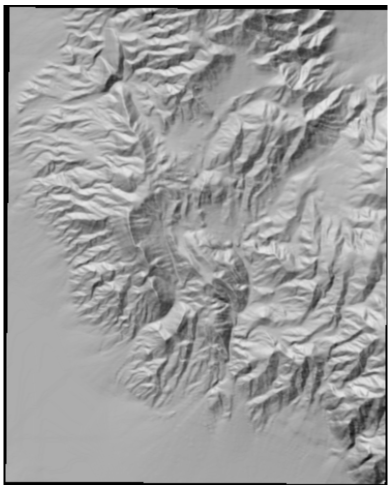


Pastel Slope Plot

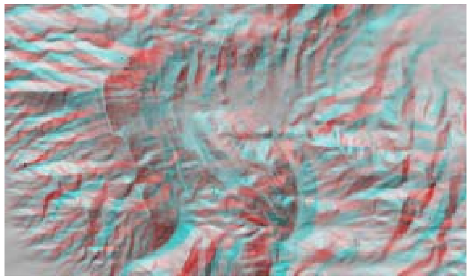
Go/No Go Slope Plot

Reflectance: A new window appears allowing you to select the sun azimuth and elevation. Click the <OK> button. The display will now turn to a gray shaded, pseudo satellite view with shadows created by the sun's position. To modify for example right-click on the window and change the sun's azimuth to 25 degrees (instead of 335). Changing your lighting parameters can help you bring out subtle terrain features that might otherwise remain unnoticed.

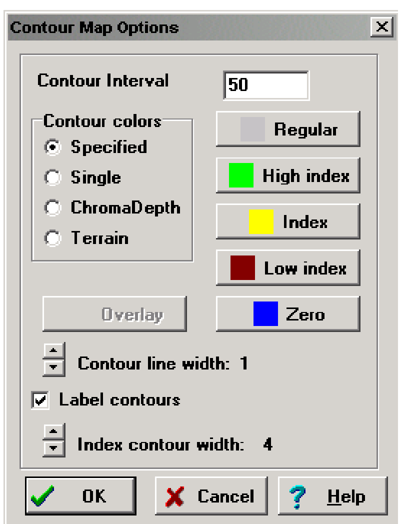


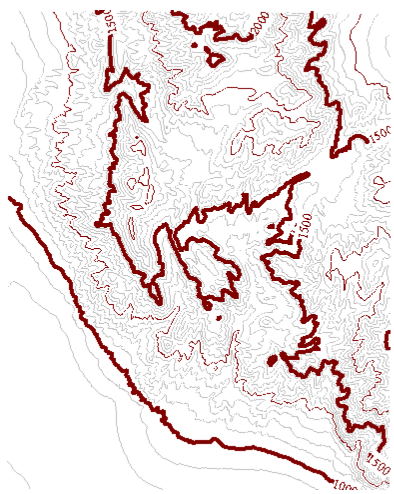


Stereo Anaglyph: Right click on your display and select Stereo anaglyph. Your elevation display will be gray-scaled with a red-blue shift which when viewed with red-blue filter glasses will allow you to view the data in 3D. Right click again and select Anaglyph vert exag to change the vertical exaggeration of your view. See **Chapter 8** for more information on stereo anaglyphs.



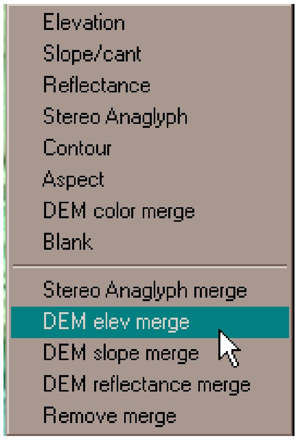
Contour: Selecting Contour will bring up the Contour Map Options window. Here you to select the contour line interval (in meters) and the colors of the contour lines. Accept the given values and click on the <OK> button. The display changes to a white background with contour lines in multiple colors. This view provides a topo-line map like appearance. Another option covered under OVERLAYS later in this tutorial will allow you to place contours over any display background such as imagery.

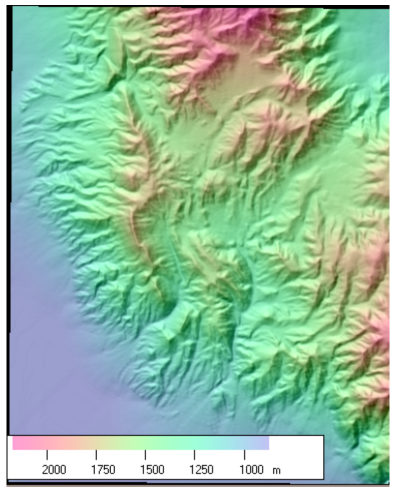


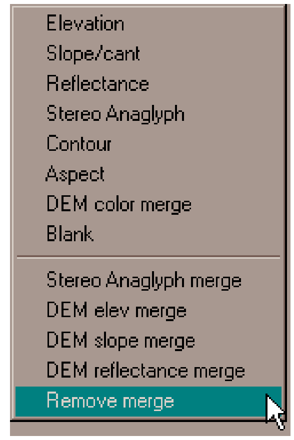


DEM Elevation Merge: Selecting DEM elevation merge from the Display Parameter menu will create an elevation display with a reflectance background and an IHS transparent foreground elevation
tint.

Remove Merge: Once you've created an DEM Elevation Merge and you want to revert back to another of the elevation display type you **MUST** select Remove Merge from the Display Parameter Dialog window.

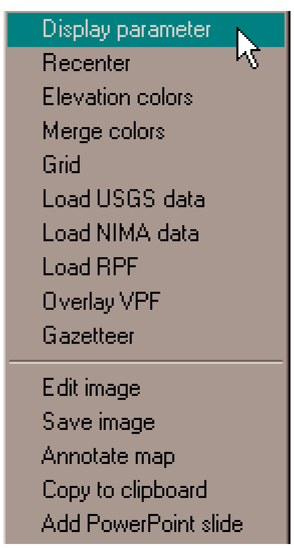


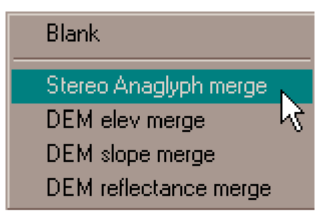


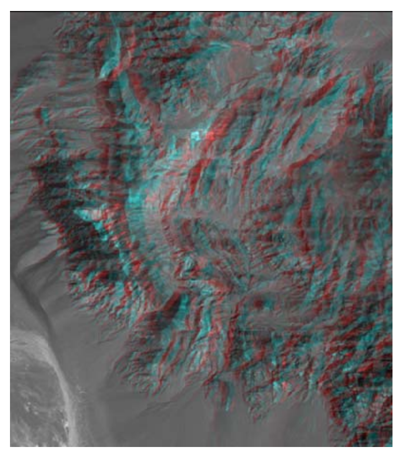


Blank: This creates a white/blank map display. You may place a grid and any overlay such as weapons fans, contour lines, point elevations you choose over the background. As you move the cursor across the white screen, you still get the coordinates and elevation in the margin. This display is very useful for printing scaled map board products on clear acetate.

Stereo Anaglyph merge: Selecting this function will create a product similar to the Stereo Anaglyph except that the map display will NOT first be gray-scaled. This will allow you to create stereo 3D views of **imagery**, **maps** and **other products**. **NOTE:** This function is entirely unsuitable for Elevation Tint, Slope/Cant and other displays with intense colors, which will simply be smeared instead of color-shifted.







Open Imagery

MicroDEM can work with many types of satellite and aerial imagery files available from NIMA, USGS, your Terrain Team's Digital Topographic Support System (DTSS) and other commercial sources. This section covers how to open four basic types of imagery.

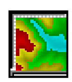
NOTE: You may display an image/map by itself for simple viewing; however, it is best to first open an elevation file covering the same area before you open your imagery/map files. Opening your elevation file and image/map together will allow you to perform many types analysis and create many 3D views.

First we'll go through an example of how to open an elevation file and image file for the same area then we'll look at how to work with the four basic types of imagery.

Open Controlled Image Base (CIB).
Open Digital Orthophoto Quads (DOQ).
Open ERDAS Imagine/DTSS Imagery.
Open Geotiff Imagery.

NOTE: Please pay careful attention to the Files of Type box at the bottom of the Open Satellite Image window to insure you are looking for the right kind of file!

First, if not already open, open the HangrockCanyon_DEM_2tar.gz file by clicking on the

<Open DEM> icon on your main menu → 

Next select the <Open IMAGE> button → 

In the Open Satellite Image window navigate to the location of the ..\Mapdata\ SAT directory and highlight the Hangrock.idx file. You may need to insure that the Files of Type box at the bottom says Image index file or All files. Click on the <OPEN> button to display the image.

Hangrock.idx is in the MicroDEM native format. If you permanently subset parts of satellite images that are in other formats, the resulting image will be saved in the MicroDEM .idx format. Permanent sub-setting is covered in the section on Data Manipulation.

Open CIB Imagery Files

Controlled Image Base (CIB) data is produced by NIMA and may be ordered through the Defense Logistics Agency (DLA) and your local supply system.

Click on the <Open IMAGE> button → 

This opens the Open Satellite Image window. Here you will navigate to the file location, normally a CD drive, of the RPF folder and double click on the A.TOC file. If you have your elevation data displayed, the footprint of the available CIB tiles will be displayed over your elevation data. If you do not have your elevation data already displayed , the foot print of the available CIB tiles will be displayed in the world vector .sin map

Double click on the northwest corner of the area you wish to display, hold down the mouse button and drag to the southeast corner before releasing. The selected tiles will be displayed as a seamless mosaic.

A second method of opening CIB allows you to open any one of the individual tiles. Be aware that the file naming convention for CIB tiles does not allow you to determine the location of a tile by its name alone. Set the Files of Type in your Open Satellite Image window to Single CIB frame or All files. Search in for the sub folders under the RPF directory and select the desired file. Remember that this is not the recommended method for displaying CIB imagery.

Open DOQ Files

Digital Orthographic Photo Quadrangles (DOQ or DOQQ) are produced by the USGS and are available for the United States. DOQs are sold through various venders and may ordered through USGS web site **http://www.usgs.gov/**. To locate free samples of USGS data check out: http://www.wood.army.mil/TVC/DefaultPageContents/download_digital_data_for_free.htm.

DOQs are aerial photography taken by the USGS and are roughly 3.75 minutes /3.75 nautical miles square in coverage and are approximately one meter resolution. You will need to use an USGS Map Index or know the name of the DOQ file you desire to open.

Click on the <Open IMAGE> button → 

In the Open Satellite Image window navigate to the location of your DOQ file. Older DOQs are available in the band interleaved .bil file format. Newer DOQs are available in geotiff .tif format. Make sure that they Files of Type field at the bottom of the Open Satellite Image window is set to either USGS DOQ (uncompressed), GEOTIFF or All files. Highlight the desire file and click on the <OPEN> button to display the file.

NOTE: Merging multiple DOQ images into one large seamless image is covered in the section on Data Manipulation.

Open ERDAS Imagine/ DTSS Imagery

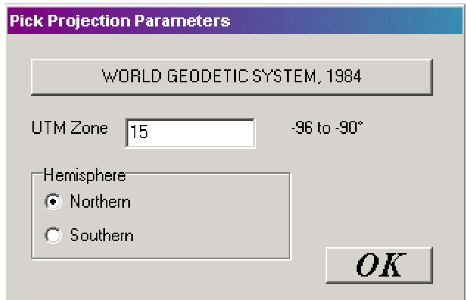
See your supporting Terrain Team/Topo Company to get imagery in the .img format.

ERDAS .img files are loaded in a similar manner as other imagery files in the MicroDEM and may be either single band/grayscale/monochromatic or multi-band/color/multispectral.

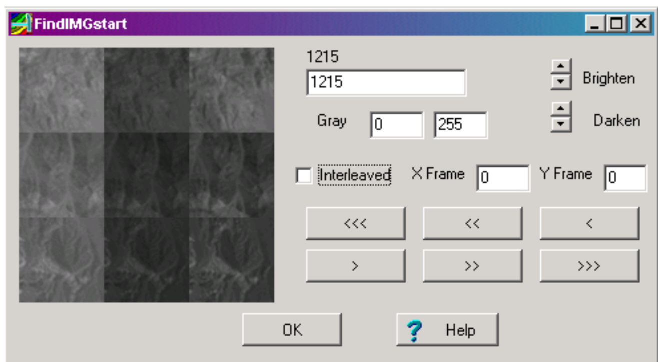
Click on the <Open IMAGE> button → 

In the Open Satellite Image window navigate to the location of the desired .IMG file. Make sure that the Files of Type field at the bottom of the window is set to either ERDAS IMG file or All files. Highlight the file name and click on the <OPEN> button to bring up the Pick Projection Parameters window. Here you need to set the proper UTM Zone and Hemisphere.

NOTE: that as you change the UTM Zone the longitude bounds of that zone are displayed to the right of the data entry field. This allows you to double check your zone.

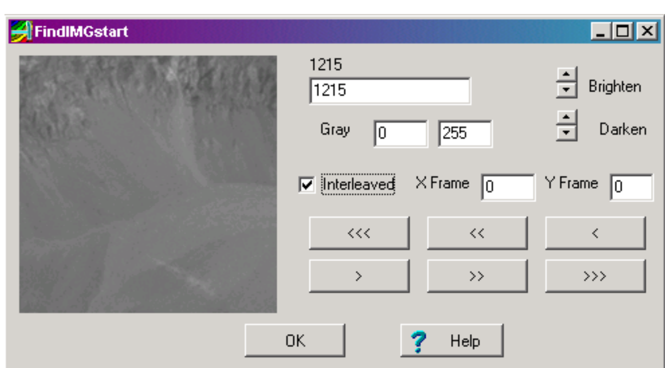


If you don't know what zone your data is in you may find the section on CARTOGRAPHY - Displaying the MGRS Grid Zones and 100K Grid Zones useful. After you make the proper entries and click on the <OK> button the Find IMG Start window will pop up.



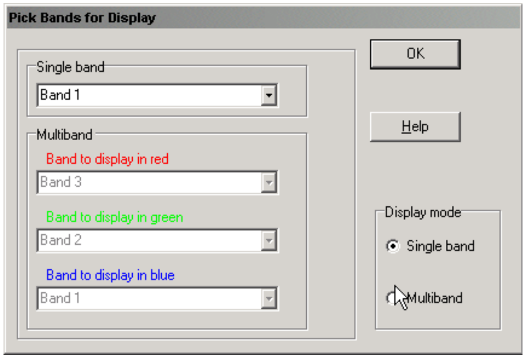
MicroDEM will make a best-guess on the proper starting point for the image. If the image is gray scale you should be able to simply click on the <OK> button to display it. If the image is a color/multispectral you'll need to check the Interleaved box before you click on the <OK> button.

If the image in the pre-view is not clear, if it has vertical or horizontal lines and blocks then the start position is incorrect and you'll need to manually change the start position by typing in the top data entry field or by clicking on the <<<,<<,<,>,>>,>>> buttons. This can be a tricky operation and you'll need to exercise patience. The Brighten and Darken controls allow you to change the image brightness to more easily see any flaws in the pre-view image. The Program now saves the starting location so you should only have to locate it once.



The image will initially come up in black and white or panchromatic gray-scale.

To view in multi-band (colors), right click on the display and select Band from the pop-up menu. This will bring up the Pick Bands for Display window.



Click on the Multiband radio button under Display mode in the lower right corner. You may also change which spectral band is displayed in which RGB color by changing the band combinations in the Multiband data entry fields. When you're satisfied with your choices click on the <OK> button to redisplay the image.

Open Geotiff Imagery

Geotiff or geo-referenced tif image files are a common commercial GIS format. Each image may be distributed as a single .tif, a .tif with an associated .tfw world file, or as set of four .tif, .tfw, .tDw and .tab files. Only the .tif and .tfw files are necessary for MicroDEM.

USGS DOQ files, USGS Digital Raster Graphics (DRG) map files and MrSID exported files are all available in the geotiff format.

Click on the <Open IMAGE> button → 

In the Open Satellite Image window navigate to the location of your geotiff file. Make sure that they Files of Type field at the bottom of the Open Satellite Image window is set to GEOTIFF or All files. Highlight the desire file and click on the <OPEN> button to display the file.

Open Digital Maps (ADRG, CADRG, or DRG)

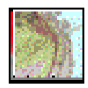
Digital maps are scanned paper maps that have been geo-referenced and saved in various digital formats. You can use them in MicroDEM and other software to display or print more paper copies. Remember to make note of the original datum the map was printed in. The UTM grid lines on the map will still be in the **original** datum. If you plan to use a different datum, such as WGS-84 in MicroDEM then you may need to provide a grid overlay of the proper datum and inform your users of the purpose of the overprinted grid.

NOTE: You may display an image/map by itself for simple viewing; however, it is best to first open an elevation file covering the same area before you open your imagery/map files.

Opening your elevation file and image/map together will allow you to perform many types analysis and create many 3D views.

Open ADRG Map Files

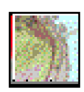
Arc Digitized Raster Graphics (ADRG) data is produced by NIMA and may be ordered through your supply system and the Defense Logistics Agency. ADRG maps are distributed as a single tiled .img (not the same as ERDAS Imagine .img) file and a .thf header file. The amount/area of the map you will display is set in the OPTIONS/IMAGERY in the ADRG X tiles and ADRG Y tiles data entry fields. The default setting is 8 x 6 tiles. An entire 1:50 TLM map is usually about 43 x 46 tiles. Remember that the larger the original image you load the more you'll have to zoom in to see the features.

Click on the <Open Scanned Map> button → 

In the Open Digitized Map window navigate to the location (normally the CD drive) of the .THF file. You may need to insure that the Files of Type field at the bottom is set to ADRG map or All files. Highlight the file and click on the <OPEN> button to display the map Overview.
The map overview image will show all the tiles of the complete map. Double click on the center of the area you wish to load. MicroDEM will then go to the CD and extract the section of the map you have indicated. Once displayed you will have additional toolbar buttons available to pan/move around the map.

Open CADRG Map Files

Compressed Arc Digitized Raster Graphic (CADRG) data is made by NIMA and is a compressed form of ADRG (55:1 ratio). **NOTE:** CADRG opens exactly the same way as CIB imagery using the A.TOC file.

Click on the <Open Scanned Map> button → 

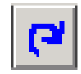
This opens the Open Satellite Image window. Make sure you have your Files of type field set to CADRG Index or All Files. Here you will navigate to the file location, normally a CD drive, of the RPF folder and double click on the A.TOC file. If you have your elevation data displayed, the footprint of the available CADRG tiles will be displayed over your elevation data. If you do not have your elevation data already displayed, the foot-print of the available CADRG tiles will be displayed in the world vector .sin map

Double click on the northwest corner of the area you wish to display, hold down the mouse button and drag to the southeast corner before releasing. The selected tiles will be displayed as a seamless mosaic.

A second method of opening CADRG allows you to open any one of the individual tiles. Be aware that the file naming convention for CADRG tiles does not allow you to determine the location of a tile by its name alone. Also be aware that different scales of CADRG use different file extensions you must therefore set the Files of Type in your Open Satellite Image window to CADRG small scale (GNC, JNC, ONC), CADRG JOG, CADRG topo (TLM), CADRG Misc or All files. Search in the sub folders under the RPF directory and select the desired file. Remember that this is not the recommended method for displaying CADRG imagery.

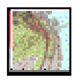
If you are attempting to load a 'Special' or non-standard product you may be asked if you would like to restrict the type of files you are looking for. If you know the scale of map you want to use, select <YES> and select the scale so that only that scale selection footprint will open. If you want to see all of the scales of maps and their coverage, select <NO>.

NOTE: CADRG maps are sub-sampled spatially and spectrally so that their quality is reduced from that of ADRG. In order to improve the image quality when zoomed-out to small-scale you should go to Main Menu and select OPTIONS/IMAGERY then check the Average zoomed out imagery box. Once you have zoomed-in to a large-scale view you'll need to switch this feature off or your map will be too blurry. Each time you switch the feature back and forth you'll need to

redraw your map by simply clicking on the <FORCE REDRAW> button → 

Open DRG Map Files (geotiff)

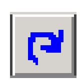
Digital Raster Graphics (DRG) data is made by the USGS and available through commercial venders, directly through the USGS or by special request through NIMA). Since USGS products may be freely distributed once purchased you can usually find the DRG for the whole state at one of the state colleges or other GIS institutions.

Click on the <Open Scanned Map> button → 

In the Open Digitized Map window navigate to the location (normally the CD drive) of your DRG file. You may need to insure that the Files of Type field at the bottom is set to Geotiff or All files.

To select the map with the desired map coverage, either use the hard copy USGS State Index to map coverage, or, if you have a hard copy of the USGS map, look up the same reference number (5 or 6 digit Latitude/Longitude number followed by the quad designation).

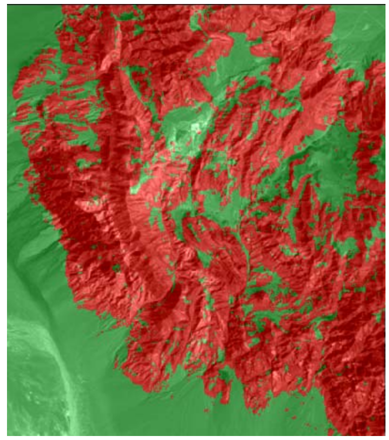
NOTE: DRG maps are scanned at a high spatial resolution (typically about 6000 x 6000 pixels) and whole map sheets will display very poorly. In order to improve the image quality when zoomed-out to small-scale you should go to Main Menu and select OPTIONS/IMAGERY then check the Average zoomed out imagery box. Once you have zoomed-in to a large-scale view you'll need to switch this feature off or your map will be too blurry. Each time you switch the feature back and forth you'll need to redraw

your map by simply clicking on the <FORCE REDRAW> button → 

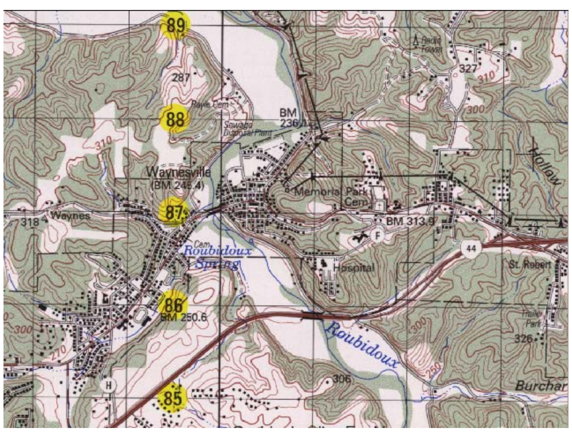
NOTE: Merging multiple DRG maps into one large seamless map sheet is covered in the section on Data Manipulation.

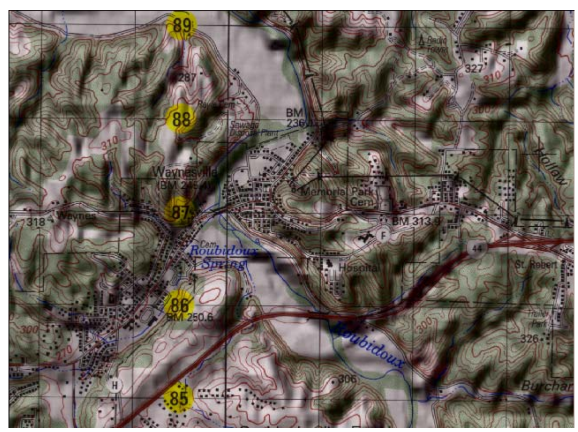
Modifying Display Parameters of Imagery and Maps

DEM slope merge: This function will create a variation of a reflectance background plot with a transparent color slope overlay.



DEM reflectance merge: This function will create a shaded relief overlay for your map. See 2D Shaded Relief Maps in **Chapter 8.**



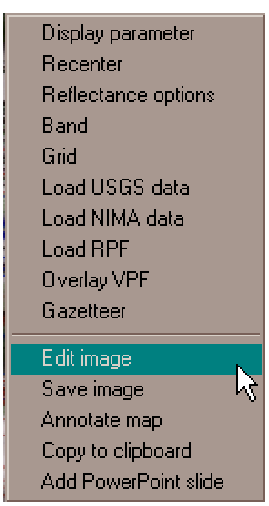


Chapter 3 Editing the Display

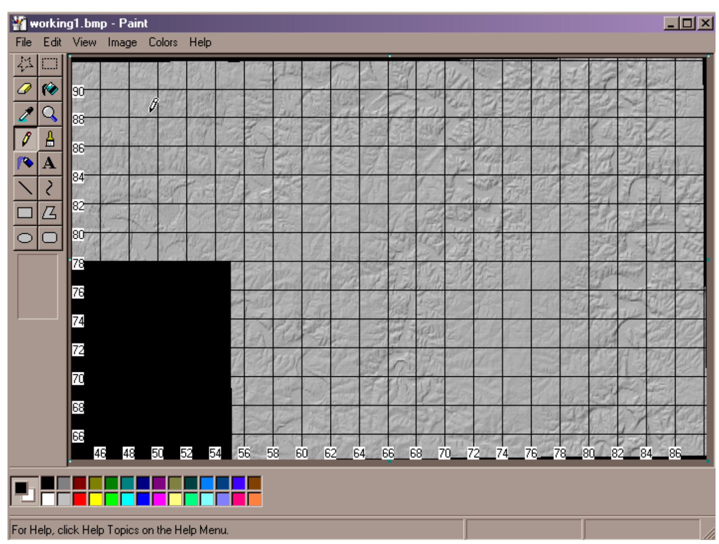
In this section we will cover several different methods for modifying your map displays.
Editing Files with Paint
Spot Elevations
Point Symbols and Text
Map Icons
Military Icons
Heads Up Digitizing AutoCAD .DXF Files
Heads Up Digitizing Shape Files with Database Attribute Files
Placement of Marginalia
Printing, Print to Scale and Print Preview
PowerPoint and MicroDEM
Data Manipulation: Subset and Merge Data Files
Merging Shoreline Elevation Data with Bathymetric Data
Merging NASA Blue Marble Datasets
Subset Elevation Files with a Rectangular Border
Subset Elevation Files with an Irregular Border
Loading and Displaying Data with the NIMA Database
Loading and Displaying Data with the USGS Database

Editing Files with Paint

This is an old method of adding operational graphics and other symbols to your display, inherited from previous versions of MicroDEM/TerraBase II. To edit your display select FILE/EDIT IMAGE at the Main menu or right – click on the display and select EDIT IMAGE from the menu.



→



This will call up your computer's default Paint/Drawing program which will open with a copy of your current MicroDEM display. After you have made the desired changes and annotations, select File/Save from you drawing programs menu. This will save the image as ‘working1.bmp’. Exit your drawing program.

In MicroDEM go to the Main menu and select FILE/LOAD IMAGE. The edited image will replace the existing display file.

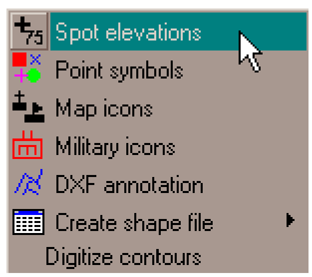
NOTE: Once you have edited your display you cannot alter its scale/size so you should give some thought to the size of your final product before you perform this step.

Spot Elevations

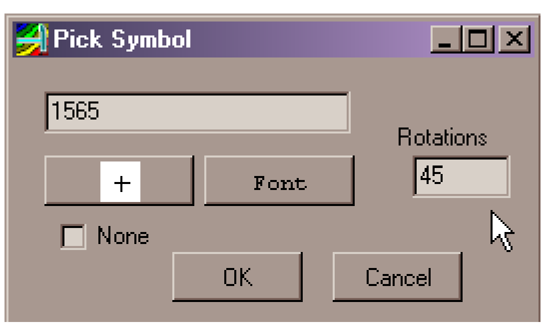
The new map editing and data creation functions have been consolidated under one icon on your display GUI menu bar. To bring up the list of available map annotation functions click on the

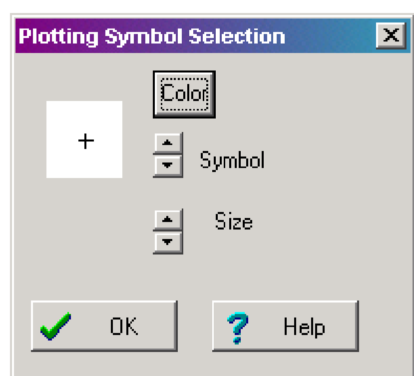
<Map Annotation> button → 

To place a point symbol with its printed elevation on your display select SPOT ELEVATIONS from the menu list. **NOTE:** You must have elevation data displayed for your AOI for these functions to be available.



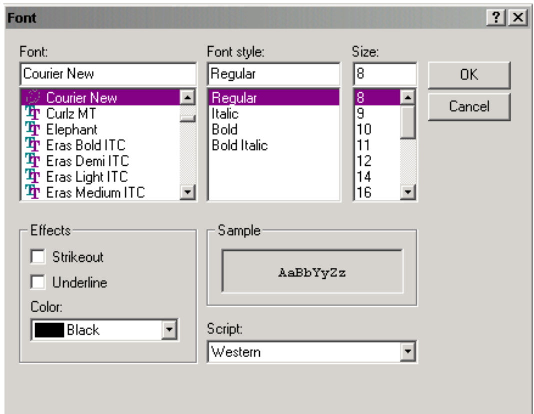
Next, double click on the desired location for placement of your Spot Elevation on your display. This will bring up the Pick Symbol window. Here you may change the point symbol by clicking on the <+> button to bring up the Plotting Symbol Selection window where you can alter the color, size and symbol used to mark the spot elevation.



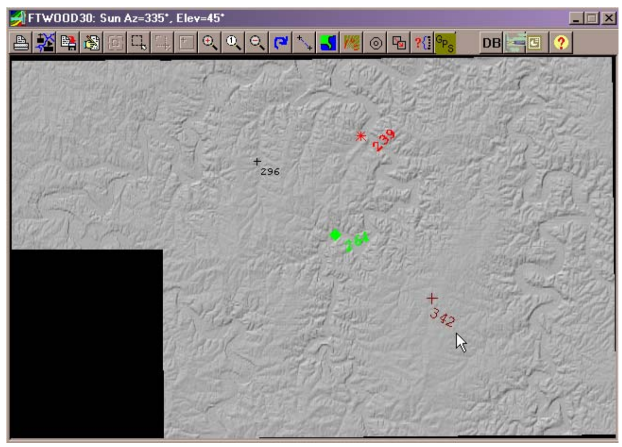


Note that you can now change the rotation or angle of your text by typing the value in the Rotations data entry field.

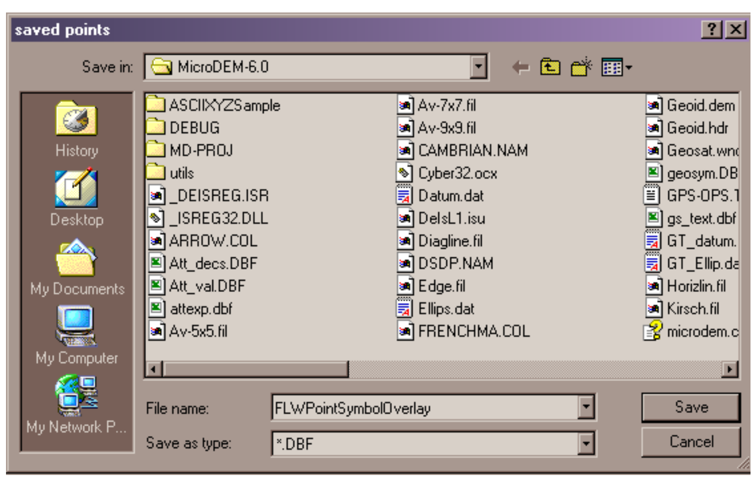
Clicking on the <Font> button will bring up the standard windows Font selection window where you can select the font type, style, size and color you desire.



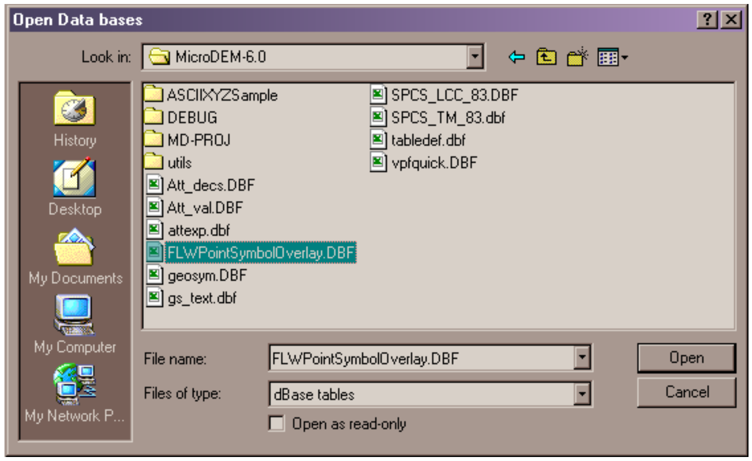
Do not change the actual elevation in the Pick Symbol data entry field. When you're satisfied with the selections you've made simply click on the <OK> button at the bottom of the Pick Symbol window to plot the point.



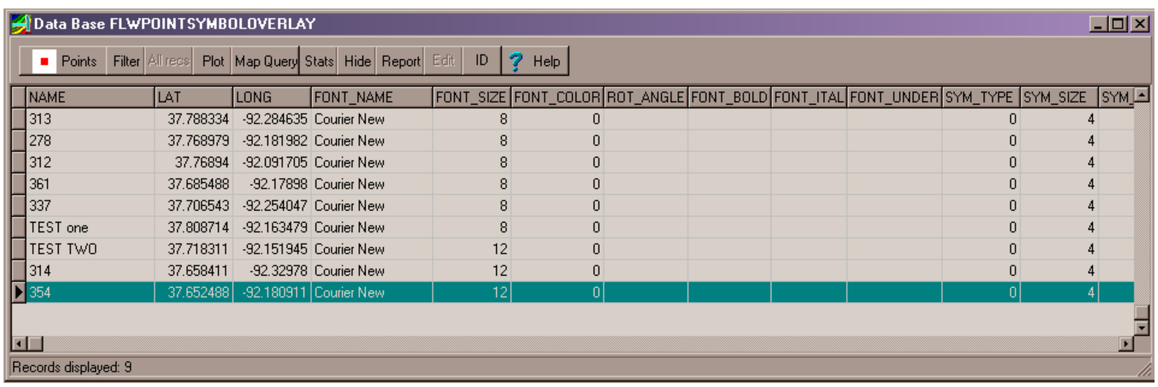
Spot Elevations and Point Symbols are saved together by selecting FILE/SAVE POINT SYMBOLS at the main menu.



Redisplay Spot Elevations, saved for your AOI, by clicking on the <DB> button → 
on your display. This will bring up the Open data bases window.

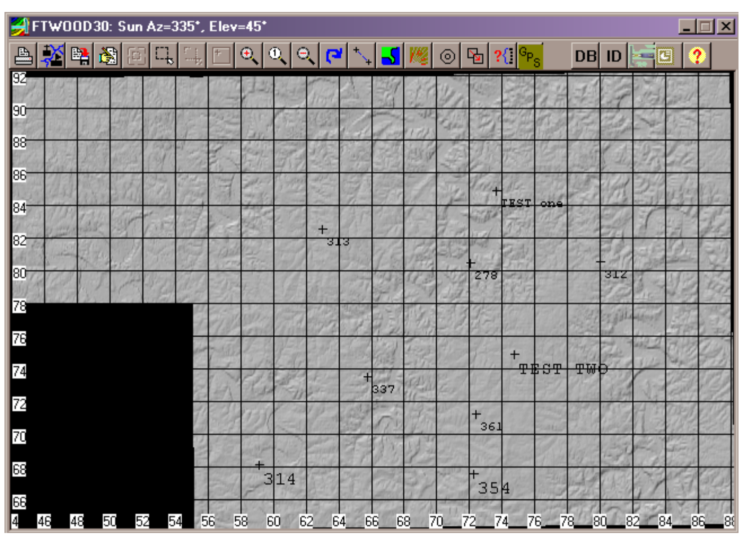


This will bring up the Data Base table for your spot elevations and display the points on you map background.

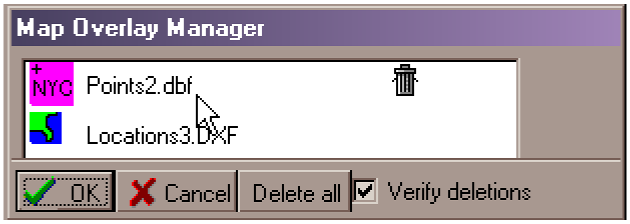


NAME	LAT	LONG	FONT_NAME	FONT_SIZE	FONT_COLOR	ROT_ANGLE	FONT_BOLD	FONT_ITAL	FONT_UNDER	SYM_TYPE	SYM_SIZE	SYM_
313	37.788334	-92.284635	Courier New	8	0					0	4	
278	37.768979	-92.181982	Courier New	8	0					0	4	
312	37.76894	-92.091705	Courier New	8	0					0	4	
361	37.685488	-92.17898	Courier New	8	0					0	4	
337	37.706543	-92.254047	Courier New	8	0					0	4	
TEST one	37.808714	-92.163479	Courier New	8	0					0	4	
TEST TWO	37.718311	-92.151945	Courier New	12	0					0	4	
314	37.658411	-92.32978	Courier New	12	0					0	4	
354	37.652488	-92.180911	Courier New	12	0					0	4	

Records displayed: 9

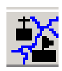


Point Symbol Overlays are removed by selecting OVERLAY / OVERLAY MANAGER from the main menu. This will bring up the Map Overlay Manager window. **NOTE:** If you only have a single overlay you will not get the pop-up Map Overlay Manager, you will simply be asked if you wish to delete the single overlay.

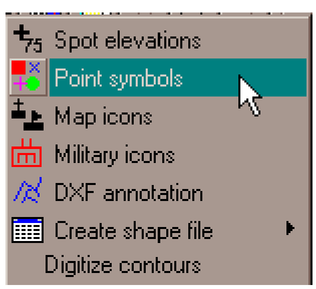


Point Symbols and Text

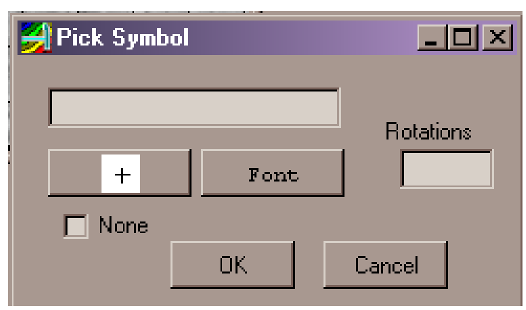
To bring up the list of available map annotation functions click on the

<Map Annotation> button → 

To place a point symbol and associated text on your display select POINT SYMBOLS from the menu list. **NOTE:** You must have elevation data displayed for your AOI for these functions to be available.

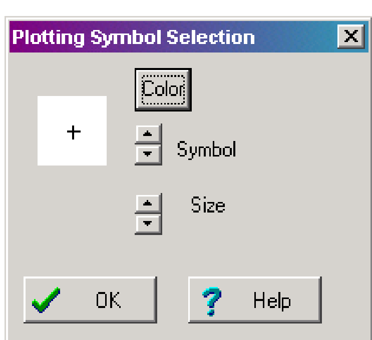


→

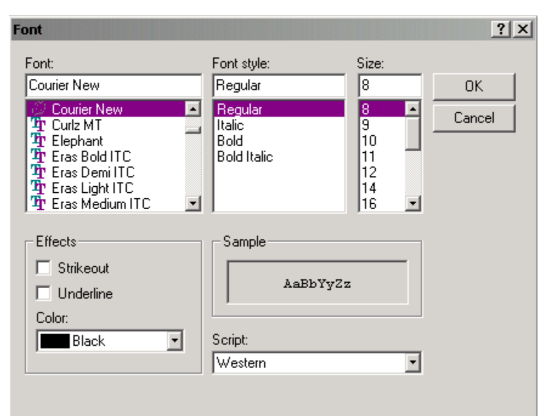


Next, double click on the desired location for placement of your Point Symbol and text on your display.

This will bring up the Pick Symbol window shown above. Here you type the text you wish plotted in the data entry field. You may change the point symbol by clicking on the <+> button to bring up the Plotting Symbol Selection window where you can alter the color, size and symbol used to mark the spot elevation.



→

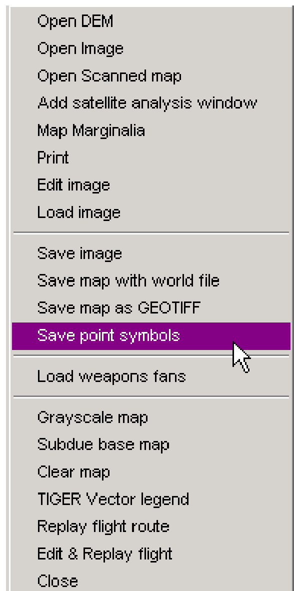


Clicking on the <Font> button will bring up the standard windows Font selection window where you can select the font type, style, size and color you desire.

Note that you can now change the rotation or angle of your text by typing the value in the Rotations data entry field.

When you're satisfied with the selections you've made simply click on the <OK> button at the bottom of the Pick Symbol window to plot the point.

Save your map symbols database files for future use by going to the main menu and selecting FILE/SAVE POINT SYMBOLS.



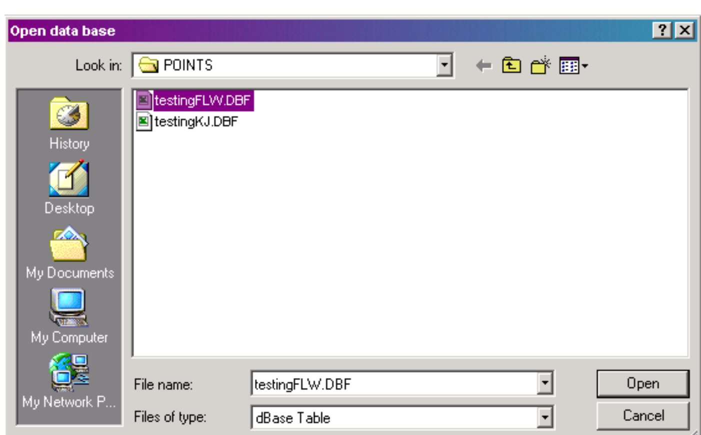
Redisplay Point Symbols by using the FILE / LOAD POINT SYMBOLS function from the main menu.

An alternative method for reloading Point Symbols is to display the background data for your

AOI then click on the <DB> button → 

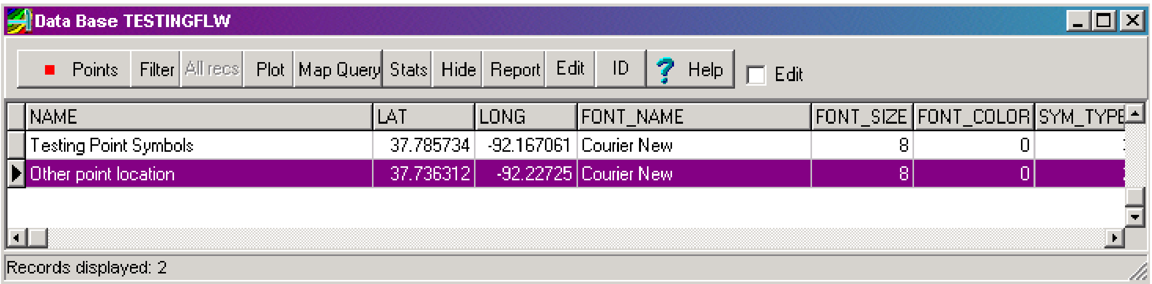
on the displays GUI bar.

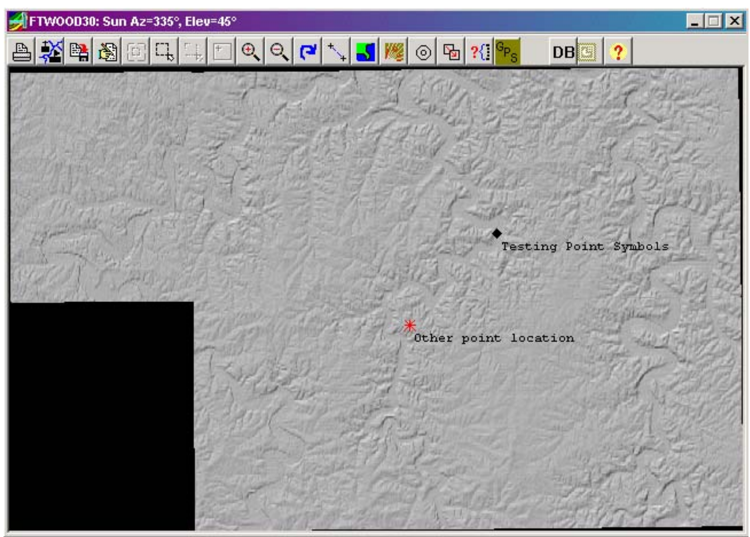
This will bring up the Open data base window.



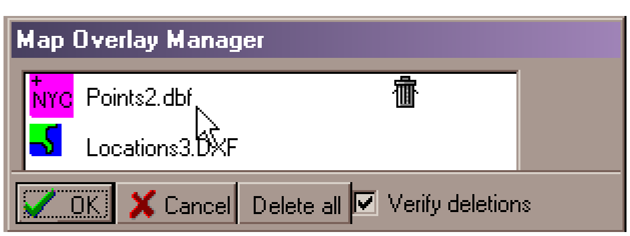
Select the .dbf file under which you saved your point symbol overlay and click on the <OPEN> button.

This will bring up the Data Base table for your point symbols and display the points on you map background.



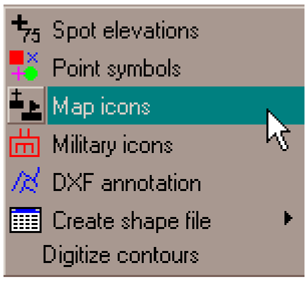


Point Symbol Overlays are removed by selecting OVERLAY / OVERLAY MANAGER at the main menu. This will bring up the Map Overlay Manager window. **NOTE:** If you only have a single overlay you will not get the pop-up Map Overlay Manager, you will simply be asked if you wish to delete the single overlay.

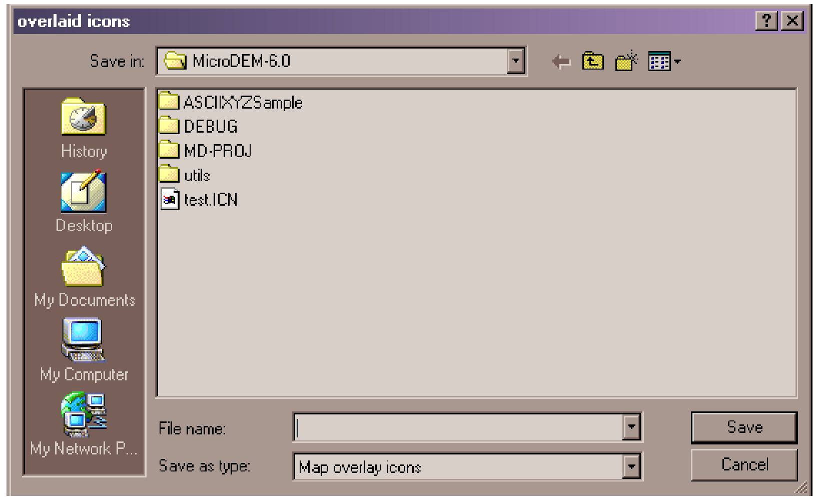


Map Icons

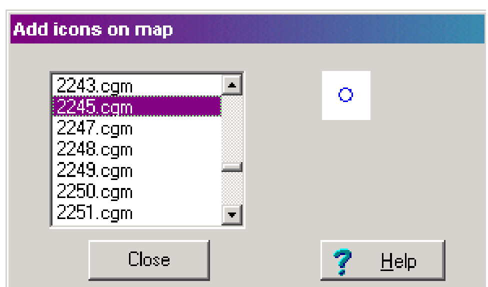
To open the Map Icons editor click on the <Map Annotation> button → 



→



This will bring up the Overlaid Icons dialog window. Type in the name for your overlay and click on the <SAVE> button.   This will bring up the Map Annotation pop-up menu.



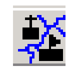
NOTE: You must have elevation data displayed for your AOI for these functions to be available. Select Map Icons from the list to bring up the Add Icons On Map window. This will bring up the Overlaid Icons window where you type a unique file name to save the overlay.

NOTE: Spot elevations and Point Symbols and Text are stored together in one database file. The overlay will appear in your OVERLAY/OVERLAY MANAGER where it may be resorted or deleted. See the previous section on the Overlay Manager in **Chapter 1**. The Map Icons overlay may be redisplayed at any time over any type of data for the same area and will be scaled to fit your current display.

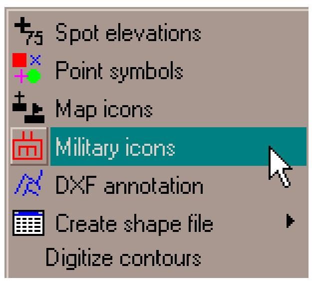
From the Add Icons on map window you can select any Computer Graphics Metafile(CGM), GIF or BMP image from the list and place it on your map by double clicking on the desired location on your display background. When you are finished placing your graphics simply click on the <CLOSE> button to close the window and save your overlay data.

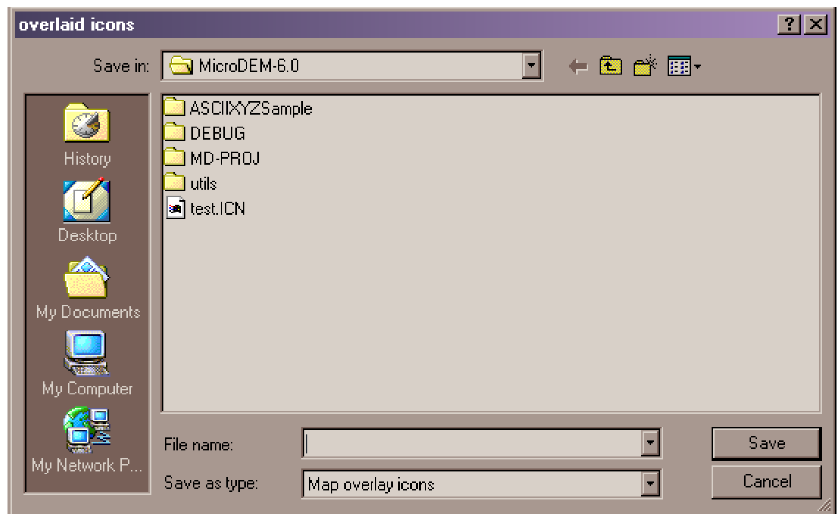
NOTE: CGM files may be sized by changing the value in the CGM Symbol Size data entry field under OPTIONS/VECTOR MAPS. GIF and BMP imagery must be pre-sized for standard display/map scales before they are placed in your ..\Mapdata\Icons directory. You may add any imagery you wish to this directory as long as it is in the .cgm, .gif or .bmp format.

Military Icons

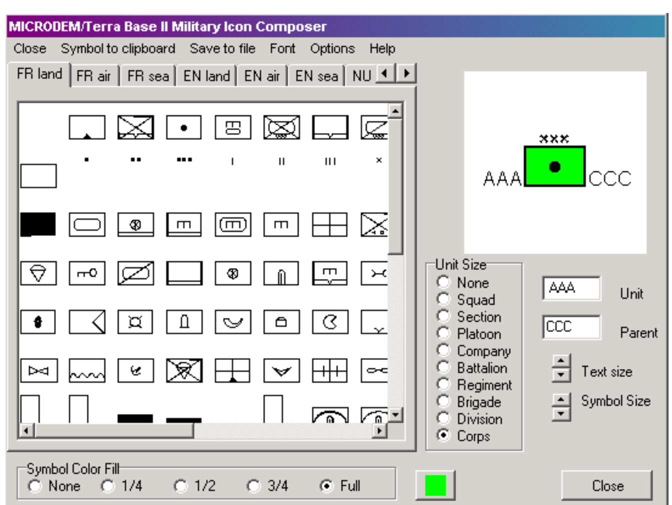
To open the Military Icons editor click on the <Map Annotation> button → 

NOTE: You must have elevation data displayed for your AOI for these functions to be available. This will bring up the Map Annotation pop-up menu.





Select Military Icons from the menu. This will bring up the Overlaid Icons dialog window. Type in the name for your overlay and click on the <SAVE> button. This will bring up the MicroDEM/TerraBase II Military Icon Composer window. You will be asked to provide a unique file name to save the overlay.



Select the desired type of icon from the FRiendly land, FRiendly air, FRiendly sea, ENemy land, ENemy air, ENemy sea, NeUtral land, NeUtral air, NeUtral sea, Map Sym, Mil Sym or Other tab. You may color the Friendly, Enemy and Neutral symbols by checking the None, 1/4, 1/2, 3/4 or Full radio button in the Symbol Color Fill section at the bottom of the interface.

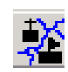
You may select the desired color by clicking on the colored button to the right of the Symbol Color Fill radio buttons.

You may add unit size symbols to Friendly, Enemy and Neutral symbols by choosing the desired radio button from the Unit Size selection area. Click in the Unit data entry field to type text that will appear to the left of your icon and in the Parent data entry field to type text that will appear to the right of your icon.

Text size and symbol size may be adjusted by clicking on the Text size and Symbol size control arrows at the lower right corner of the interface.

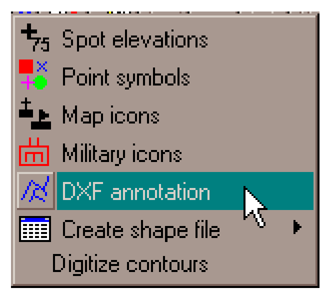
NOTE: Keep an eye on the symbol you're building in the display at the upper right hand corner of the interface. Any part of the text or symbol that does not appear in this white box display area will not appear on your map. Some sizes do not scale well; if this happens, you should increase or decrease the symbol size until its appearance is satisfactory.

Heads Up Digitizing AutoCAD .DXF Files

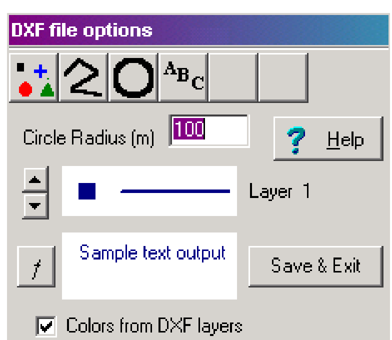
To open the Military Icons editor click on the <Map Annotation> button → 

NOTE: You must have elevation data displayed for your AOI for these functions to be available.

This will bring up the Map Annotation pop-up menu.



Select DXF annotation to bring up the DXF file options window.



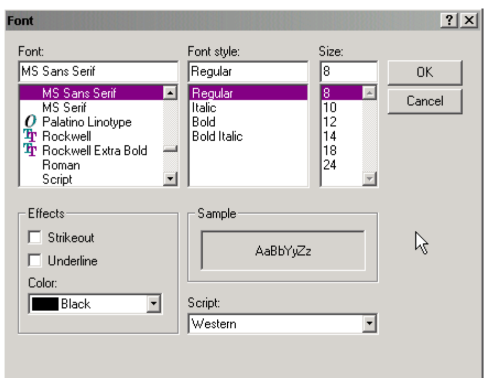
You may select from fifteen pre-defined symbol layers by clicking on the control arrows in the middle of the interface. You may mix the layers on any overlay as needed.

Clicking on the first Point symbols button will allow you to place point symbols on your map by double clicking on the desired location of your map display.

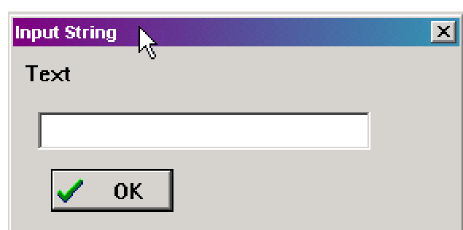
The second Polyline button will allow you to digitize lines and polygons by double clicking nodes on your map display. When you have finished delineating your line or polygon simply right mouse click and select End polyline to terminate the line or select Close polyline close the polygon.

Selecting the third <Circle> button will allow you to place a circle on your map display whose radius, in meters, is defined in the Circle Radius (m) data entry field.

You may select the font characteristics of your text by clicking on the <f> button that will bring up the Font selection window.



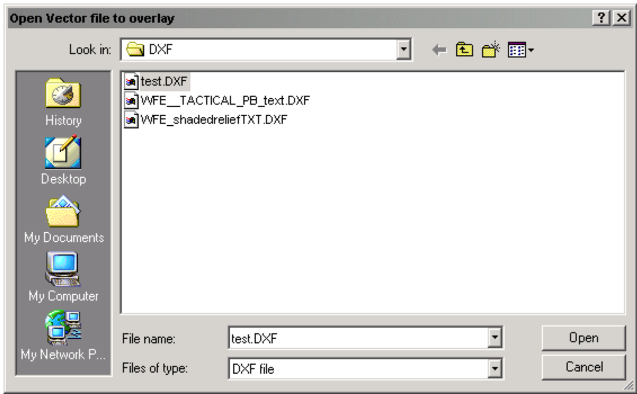
Clicking on the fourth <ABC> Text labels button will allow you to double click on your map display to identify the starting point of your text. This will bring up a small text entry window where you will type your text.



Once you have finished editing your .dxf overlay you must click on the <Save & Exit> button. Here you'll give the overlay a unique file name under which it will be saved. The overlay may be distributed to other users of AutoCAD or similar Computer Aided Design (CAD) software or other MicroDEM/TBII users. Some aspects of these DXF files (notably text font descriptions) are not standard, and will probably not display correctly in other programs.

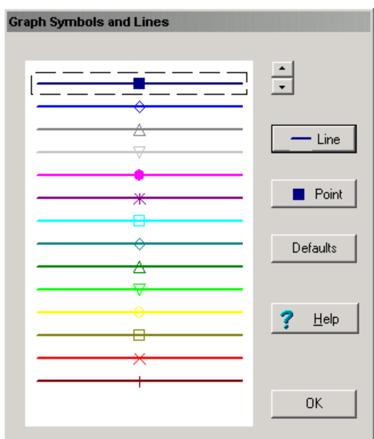
While your overlay is loaded it will appear in the stack of your OVERLAY / OVERLAY MANAGER . You may drag and drop any of the overlays to alter the order in which your overlays are displayed. This is where you will delete any or all of your overlays by dragging them to the trash can. **NOTE:** If you only have a single overlay you will not get the pop-up Map Overlay Manager, you will simply be asked if you wish to delete the single overlay.

You may reload or re-display your .dxf overlay over any other data for the same area by going to the main menu and selecting OVERLAY / VECTOR OUTLINES. This will bring up the Open vector file to overlay window.



Here you will need to select DXF file or All files from the Files of type list at the bottom of the window. Once you have selected the desired file it will be scaled to fit your current map display.

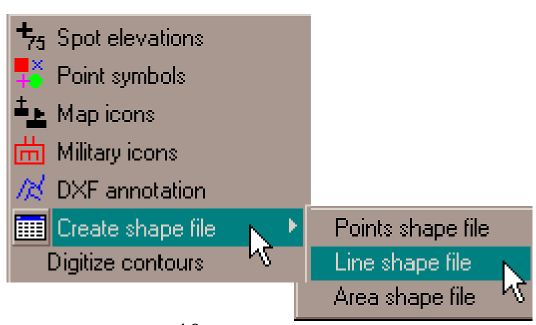
You may change the default color, size and type of the points symbols and the color and weight of the line symbols for each of the fifteen pre-defined layers by selecting OPTIONS / VIEWS <DXF OVERLAY COLORS> which will bring up the Graph Symbols and lines window.



Heads Up Digitizing Shape Files with Database Attribute Files

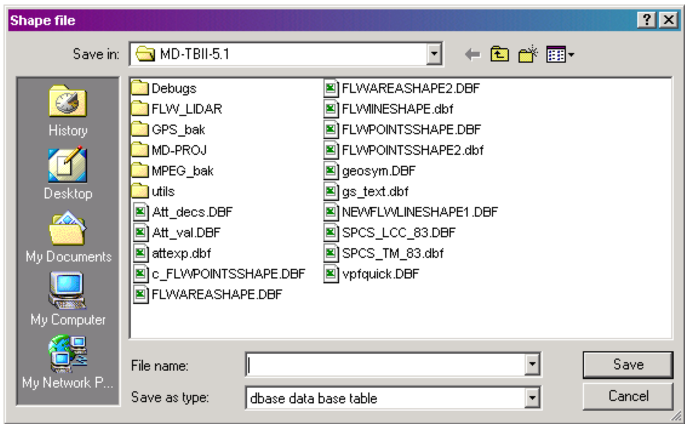
To start Shape file digitization click on the <Map Annotation> button → 

This will bring up the Map Annotation pop-up menu. **NOTE:** You must have elevation data displayed for your AOI for these functions to be available and function correctly.



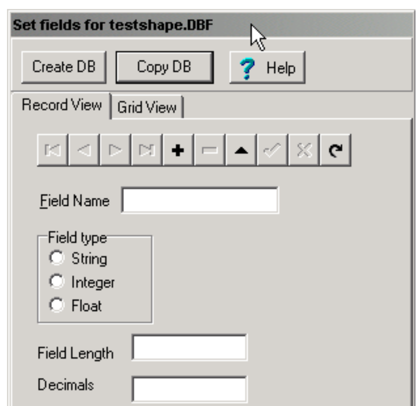
Select Create shape file to bring up the shape feature selection list.

Select point, line or area features to be digitized. This will bring up the Shape file- naming window where you give your database file a name. After you've entered the file name click on

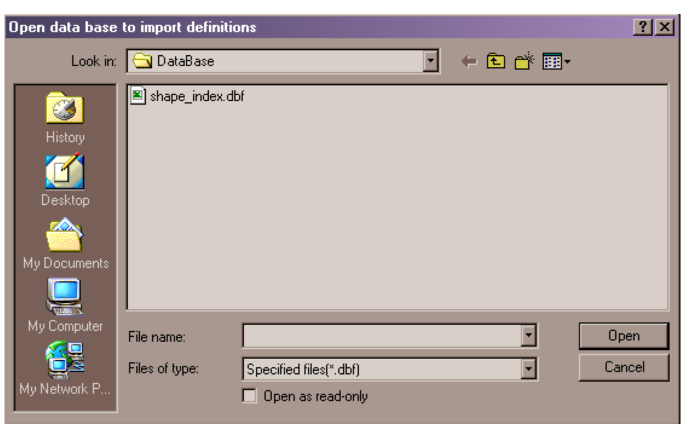


the <SAVE> button, this will bring up the Set fields for database window where you'll create your database table structure.

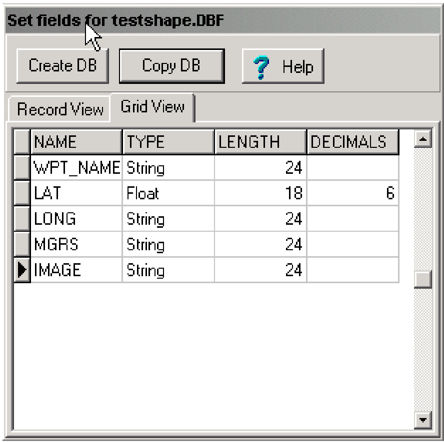
If you wish to duplicate the structure of a pre-existing database simply click on the <Copy DB> button in the Set Fields for database-name.dbf window.



This will bring up the Open Database to Import Definitions window where you will navigate to and select the database file whose structure you wish to copy.



You will be shown the structure of the selected database and will be asked to confirm the selection you have made by clicking on the <YES> button in the Confirm pop-up window.



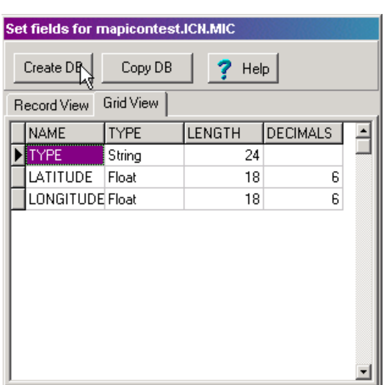
After clicking on the <YES> button you may begin digitizing your feature by double clicking on your display.

If you want to create the data base table from scratch, you will begin working to design the database. You should already have an idea what attributes or information you want to store about the features you are digitizing. The information for individual points, lines or polygons will each be stored in a separate record or line of your database table. Field names in this table are limited to 10 characters, and cannot use a blank space (the underscore) is frequently used instead. You may wish to store the specific name of a feature in a field called 'NAME'. You may wish to store the load classification of a bridge in a field called 'LOAD_CAP' or you may wish to store the location of a corner or center point of your feature in a field called 'MGRS'.

NOTE: If you forget to include a column/ field in your database you may add it at a later date. See **Chapter 9** Adding Data Fields to Shape Database Files.

In the Set fields for database window type the title or column header of the field name in the Field Name data entry field then select the field type from the Field type radio selection buttons. If the default field length and number of decimals are not long enough then you may change them in the Field length and Decimals data entry fields.

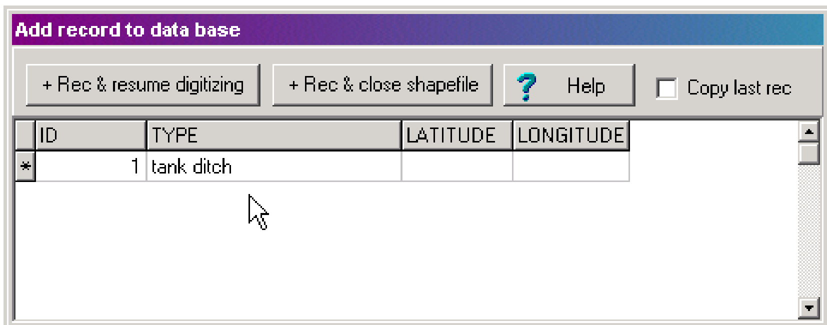
Click on Grid View tab to see the table you've created. It may be necessary to toggle back and forth between the Record View and Grid View tabs to properly display all new fields.



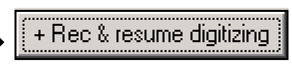
When you're ready to start digitizing click on the <Create DB> button → 

Start digitizing by double clicking on each point on your map display.

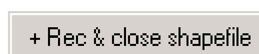
When you have finished digitizing simply right click to bring up the Add Record to Database window.



Here you can type in the required attributes under each column for each feature you have digitized.

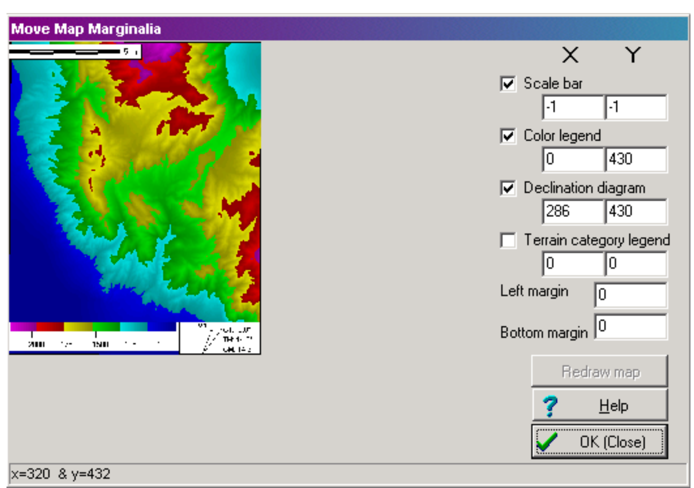
To continue digitizing click on the <+Rec & resume digitizing> button → 

When you have completed digitizing and typing attribute information in the database simply click

on the <+ Rec & close shapefile> button → 

Placement of Marginalia

There are now **two** methods for creating product layouts with marginal data. Marginal data includes titles, legends, scale bars and declination diagrams. The first method allows marginalia to be placed anywhere within the map display or border of your map display. The specific placement of the individual components is accomplished by selecting FILE and MAP MARGINALIA at the main menu.

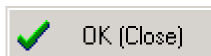


This will bring up the Move Map Marginalia window with a small version of your main display and the controls to place the scale bar, color legend, declination diagram and terrain category legend. To enable the feature simply check the box and type in the proper X, Y (pixel) coordinates for placement.

The screen coordinates of the current mouse pointer position are displayed in the lower left corner as you move your mouse pointer over the face of the duplicate display.

Click on the <Redraw map> button → 

to redraw your display with the changes.

Click on the <Close> button → 

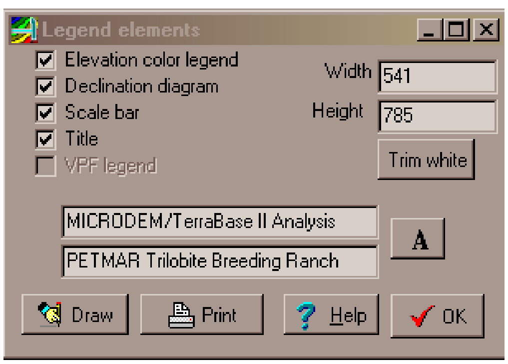
when you are done.

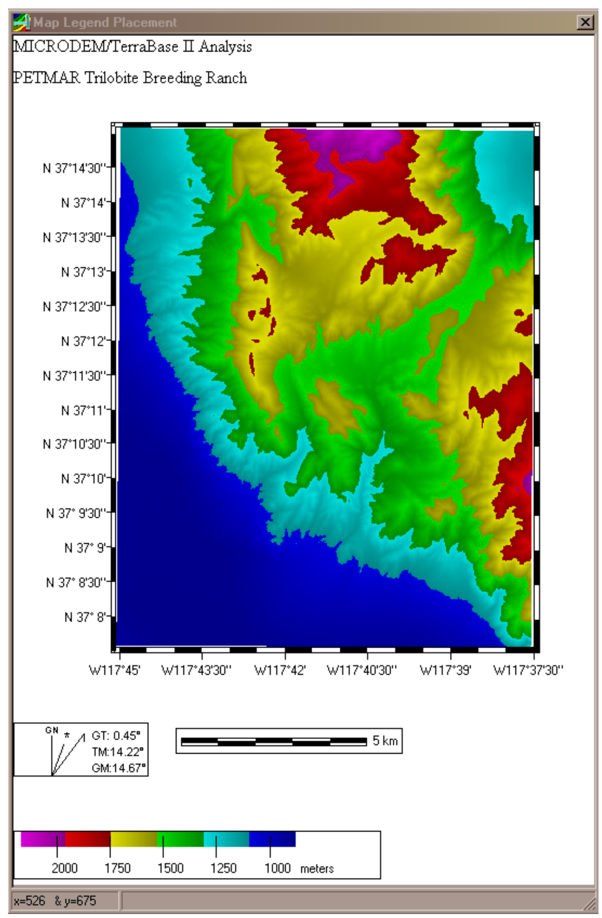
NOTE: Left and Bottom margins are only available for elevation displays for the present time. These fields will be grayed-out for other products. Imagery and map displays will require placement of scale bars and legends within the body of the display.

The second method is accessed via the <Print> button on your display → 

This will bring up the print menu.

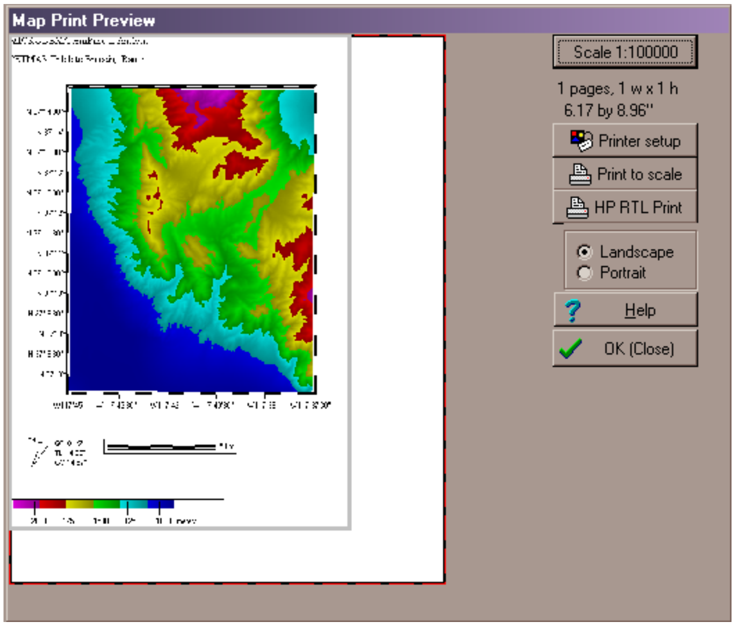
Select Prepare Printer Image →





This will bring up the Legend Elements Dialog window and the Map Legend Placements display.

Check the boxes for desired features and type the desired title and subtitle in the Legend elements window. Click the <Draw> Button to display the changes. Once the Map Legend Placements display looks like you want it click the <Print> button to bring up the Map Print Preview dialog.



The procedure for printing or plotting to scale is outlined in the following section.

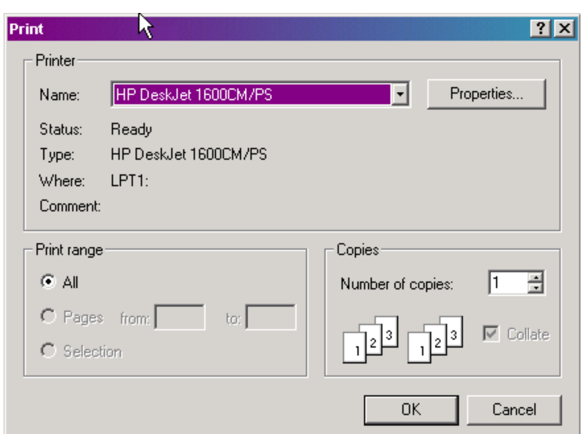
Printing, Print to Scale and Print Preview

Quick print allows you to print your current display to a single page on your printer.

Select the <PRINT> button → 

This will bring up the print selection pop-up window.

Selecting <u>Quick print current screen</u> bring up the printer driver for your default windows printer.

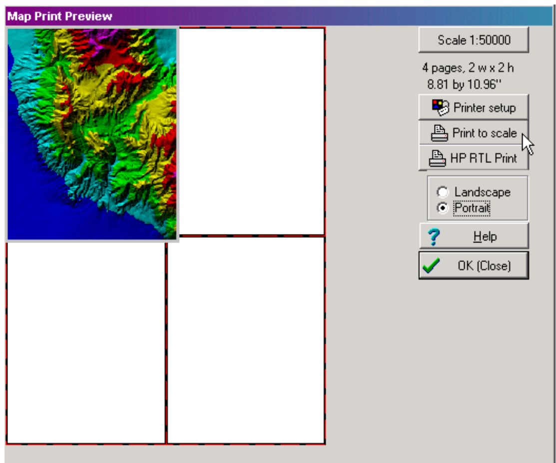


Here you may select an alternate printer and set your printer properties. Follow standard print instructions to select the printer defaults. When ready click the <OK> button to print your display to a single page.

Print Preview allows you to print your current display to scale on one or more sheets of paper.

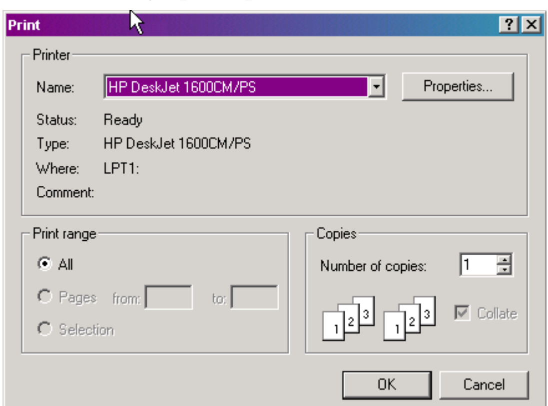
Selecting Print preview & print to scale

from the print list will bring up the Map Print Preview window.



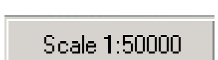
Select the <Printer setup> button →

This will bring up the printer driver interface for your chosen printer.

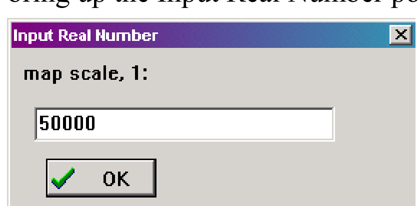


Here you may select an alternate printer and set your printer properties. Follow standard print instructions to select the printer defaults. When ready click the <OK> button.

Click on the <Scale> button →



to bring up the Input Real Number popup.



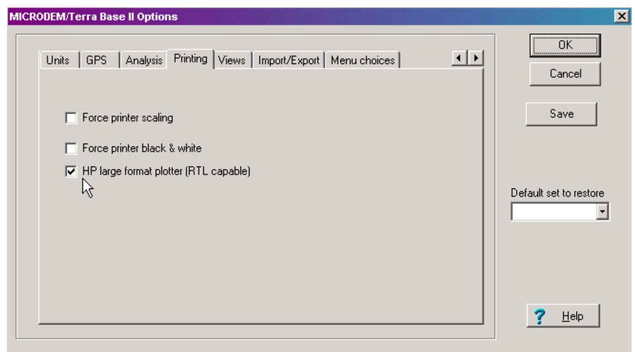
Here you should enter the scale for you map output. You can experiment with various scales and see the number of pages and actual output size in inches displayed in the <u>Map Print Preview</u> interface. When you are ready click on the <OK> button to close this popup window and return to the <u>Map Print Preview</u> window.

Click on the proper output format <u>Landscape/Portrait</u> radio buttons. → (This only affects HP RTL printing.)

If you are using a standard printer click on the <Print to scale> button →

If you are using a Hewlett Packard plotter click on the <HP RTL Print> button →

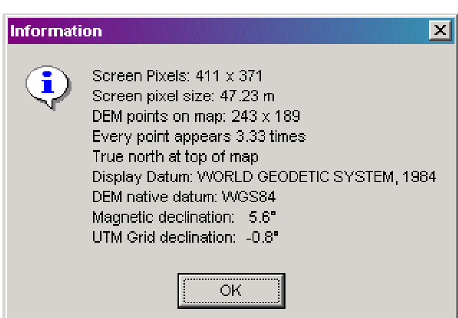
NOTE: This option is disabled by default; if you have an RTL capable plotter and want to use it you will need to check the HP large format plotter (RTL capable) box in <u>OPTIONS</u> under the <u>Printing</u> tab.



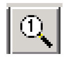
Your map will now be printed. If you have a slow computer, are printing a large file or are printing at a large scale this may take awhile. To close the <u>Map Print Preview</u> window click on

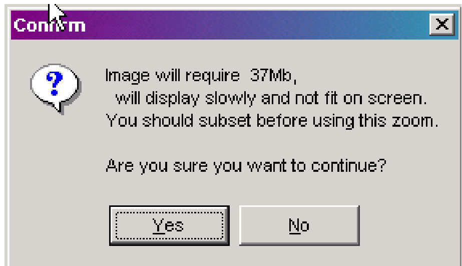
the <OK(Close)> button →

NOTE: The quality of the hardcopy output from quick print and print preview will depend on the **on-screen quality** of your display. For best results you should zoom-in your display to as close to full resolution as possible on your computer. To check your current display quality go to the Main Menu and select INFO this will bring up the <u>Information</u> window.



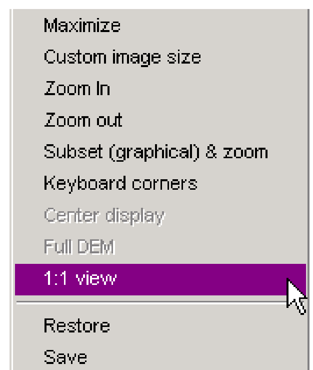
The fourth line "Every point appears 3.33 times" shows that I'm displaying every ground pixel 3.33 times. Anything better than or approaching 1.0 times will provide good quality output.

Use the <1:1View> button →  to display each ground pixel as one screen pixel. Large areas of high-resolution data may push the limits of RAM and virtual drive space on your PC. When you begin to strain your PC's capabilities you will receive the following Confirm window.



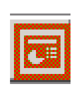
The point that each computer will give-up-the-ghost and crash will vary from PC to PC and will depend on the size of the file and type of data you are displaying. You should make note how your own computer behaves with each different type of data.

Alternatively, you can select a 1:1 display with the Modify, Map, 1:1 view menu choice.

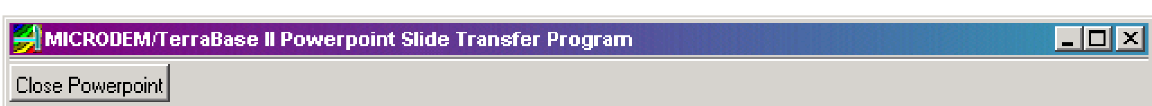


Power Point and MicroDEM

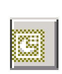
To put MicroDEM images or products into Power Point briefing go to the Main Menu GUI

buttons and select the <Power Point Presentation> button → 

This will start PowerPoint and bring up the MicroDEM/TerraBase II Power Point Slide Transfer Program window.



Highlight the title bar of the map display you wish to capture and click on the

<Add Image to Power Point Presentation> button → 

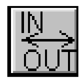
When you've transferred all the images from your MicroDEM displays remember to save your PowerPoint presentation before closing Power Point.

Data Manipulation: Subset and Merge Data Files

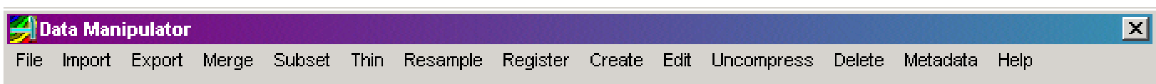
This collection of tools give you a great deal of flexibility in importing data, exporting data and creating your own tailored DEM, imagery and map files. These functions are especially helpful in creating smaller files for specific missions, or merging files if you need a larger area or a subset that falls on the boundary of two or four files. There are many functions in Data Manipulation; this tutorial covers the primary two – Merge and Subset.

Merge Elevation Files

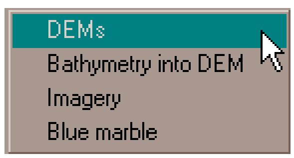
Select the <DATA MANIPUL ATION> button →



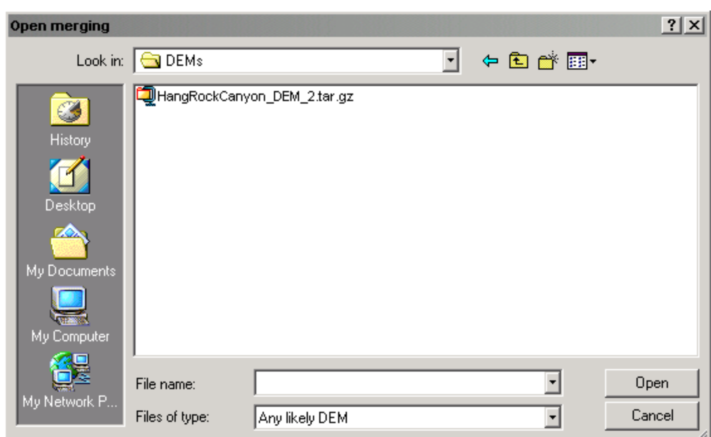
This will bring up the Data Manipulator window with the following menu.



Select MERGE to bring up the merge products list.



Selecting DEMs from the list will bring up the Open Merging window.



Navigate to the correct directory of the files you want to merge. Select the desire elevation file and hit the OPEN button or double click on the file name. The file will be added to the list in the Data Manipulator window.

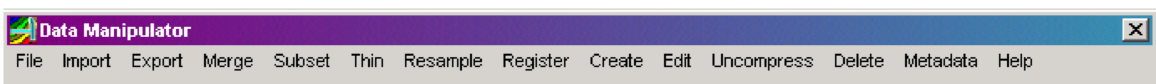
Continue to select elevation files you wish to merge. When you have selected all desired files to merge click on the <Cancel> button.

At the Merged DEM window type the name for the merged file and click the <SAVE> button. A series of Loading DEM progress bars will pop-up, one for each cell your are merging, followed by Writing New DEM and Checking Elevations progress bars. Your file now becomes a DEM whether it was initially a DTED file or DEM.

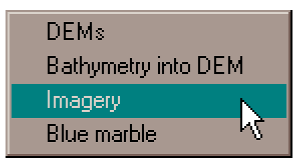
The merged DEM will be displayed along with a Information window which will allow you to close the temporarily displayed DEM by clicking on the <OK> button.

After you've closed the temporarily displayed DEM close the Data Manipulator window by selecting FILE/CLOSE or by clicking on the <X> button at the top right corner.

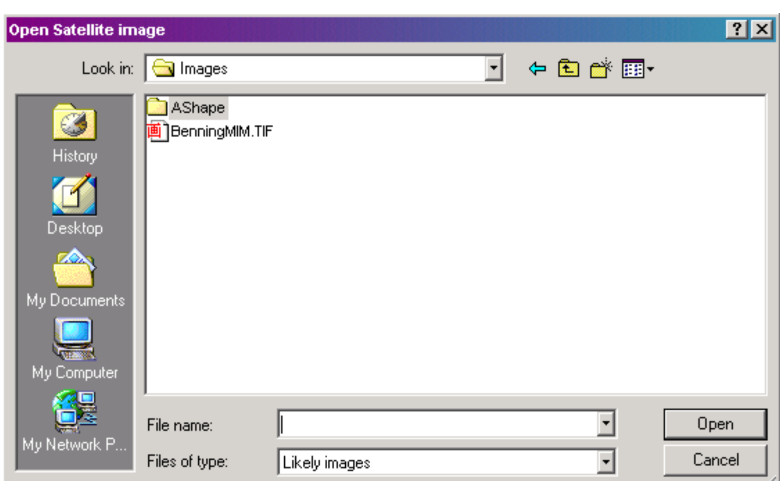
Merge USGS Image and Map Files



At the Data Manipulator menu select Merge to bring up the popup menu.

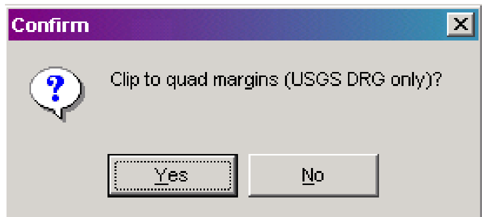


Selecting IMAGERY from the list will bring up the Open Satellite Image window. Navigate to the correct directory of the files you want to merge.



NOTE: MicroDEM does not currently support merging Arc Digitized Raster Graphics (ADRG). This procedure is for merging USGS Digital Raster Graphics (DRG) Maps and Digital Orthopoto Quads (DOQQ). Merging Compressed Arc Digitized Raster Graphics (CADRG) is accomplished by creating a new A-TOC.DBF or area table of contents file and is covered in **Chapter 8** Advanced Functions.

Continue to select the files you wish to merge. When you have selected all desired files to merge click on the <Cancel> button. This will bring up the Confirm window. Select <YES> if you are merging Digital Raster Graphics (DRG) maps and select <NO> if you are merging Digital Orthophoto Quads (DOQQ). Answering <YES> will strip the marginal data that was scanned along with the paper map.

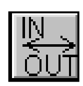


At the Image Merge window type the name for the merged file and click the <SAVE> button.

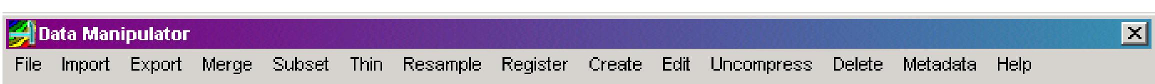
Close the 'Data Manipulator' window by selecting FILE/CLOSE or by clicking on the <X> button at the top right corner.

Merging Shoreline Elevation Data with Bathymetric Data

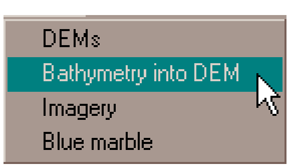
Select the <DATA MANIPUL ATION> button →



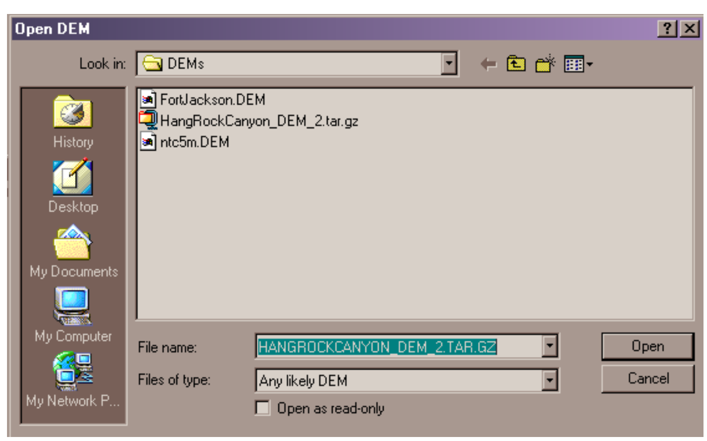
This will bring up the Data Manipulator window with the following menu.



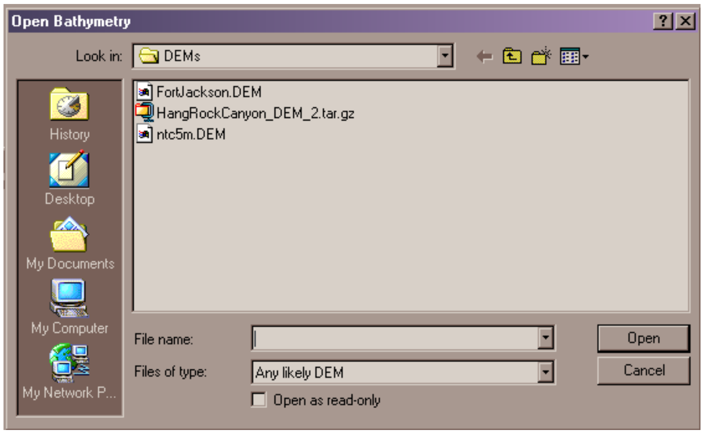
At the Data Manipulator menu select Merge to bring up the popup menu.



→

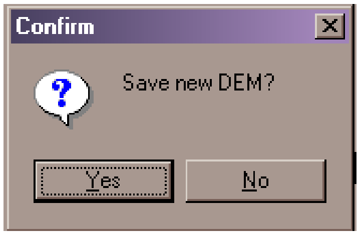


This will bring up the Open DEM dialog window where you will navigate to and select the desired elevation data for your merge. Click on the <Open> button to continue.

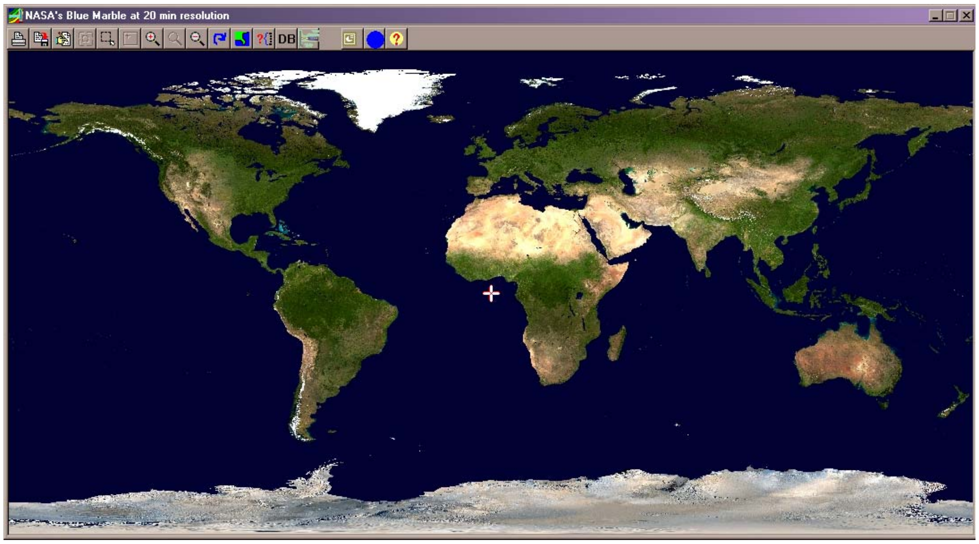


This will bring up the Open Bathymetry dialog where you will navigate to and select the adjoining subsurface elevation data. Click on the <Open> button to continue.

The merged data will be displayed and you will be given the choice of saving or not saving the new data file.



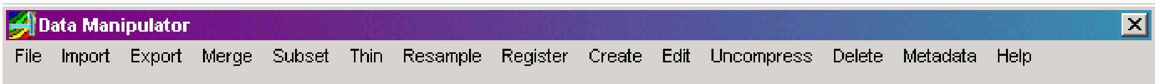
Merging NASA BlueMarble datasets



NASA offers 1 km resolution imagery of the world, from the Moderate Resolution Imaging Spectroradiometer, or MODIS.

To use this data [FTP the data](). You want t0 download both the [MOD09A1.E.interpol.cyl.retouched.3x21600x21600]() and [MOD09A1.W.interpol.cyl.retouched.3x21600x21600]() files

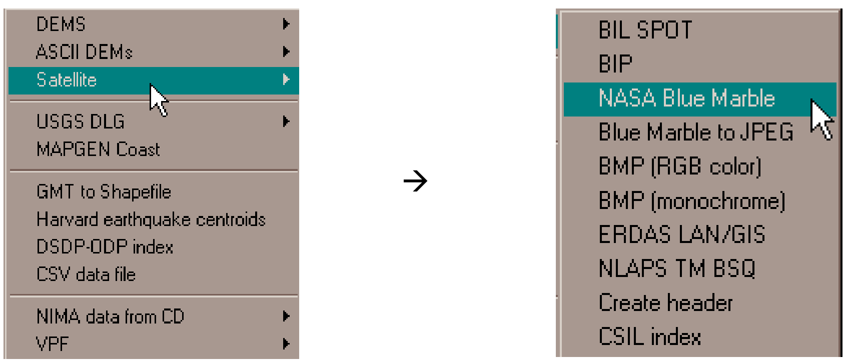
Decompress the two files, by using MicroDEM's gzip function. Select FILE/DATA MANIPULATION. This will bring up the Data Manipulation menu.



Select UNCOMPRESS then select UNIX GZ file from the menu.

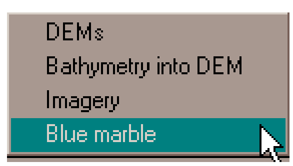
After decompression, you will have files about 1.5 GB in size. You can now delete the .gz files if disk space is a premium.

Import the two files by selecting IMPORT/SATELLITE from the Data Manipulation menu.



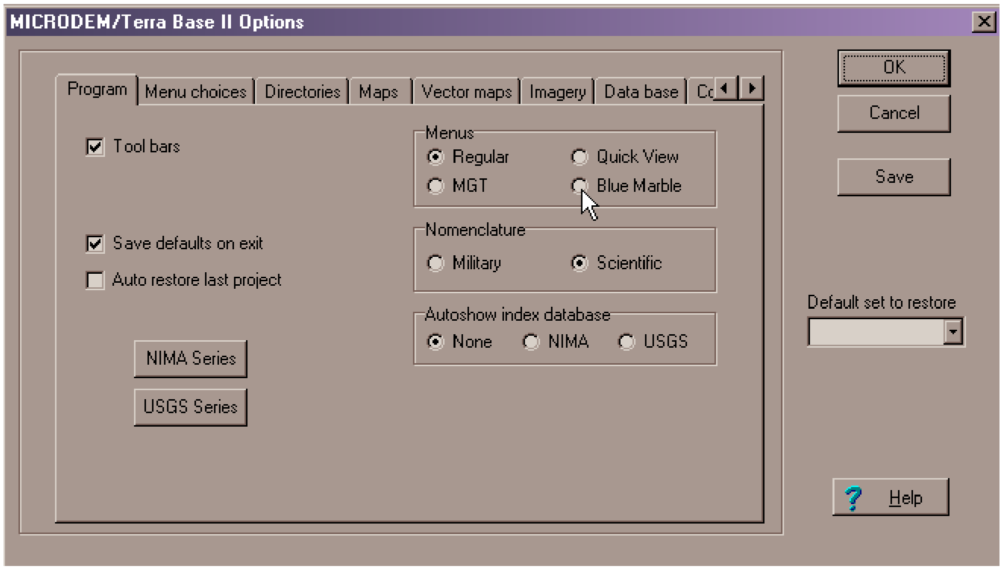
Next select NASA BLUE MARBLE from the pull-down menu. The default settings should all be correct. After this is done you can delete the two 1.5 GB files if disk space is a premium.

Merge the two files by selecting MERGE from the Data Manipulation menu, then select BLUE MARBLE from the pull-down menu.

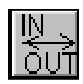


The files must be named "east_hemi.bn*" and "west_hemi.bn*" and must be placed in your \Mapdata \NASA directory. Once merged you will have one file for the world. You can now delete the files for the two hemispheres.

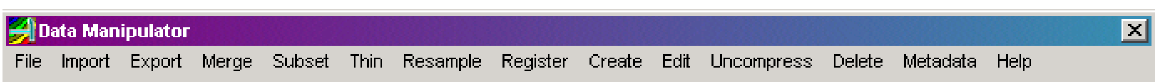
You can use the Blue Marble imagery as your default world map display by selecting OPTIONS at the main menu. Select the Program tab and check the Blue Marble radio button as shown below.



Subset Elevation Files with a Rectangular Border

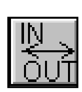
Select the <DATA MANIPUL ATION> button → 

This will bring up the Data Manipulator window with the following menu.



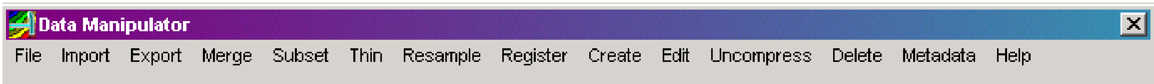
Select DEM RECTANGLE and GRAPHICAL. This will bring up the Open New DEM window where you will navigate to the specific elevation file you wish to subset. Once you've selected the file it will be displayed in MicroDEM. The next step will be to click on the northwest corner of the desired subset, holding the left mouse button down drag to the southeast corner of the desired subset area. A Subset DEM window will open which will require you to designate the location and file name for the output file. The new elevation subset will be written. Close the graphical 'Selection Map' window by clicking on the <X> button at the top right corner of the display.

Subset Elevation Files with an Irregular Border

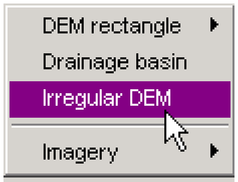


Select the <DATA MANIPUL ATION> button →

This will bring up the Data Manipulator window with the following menu.

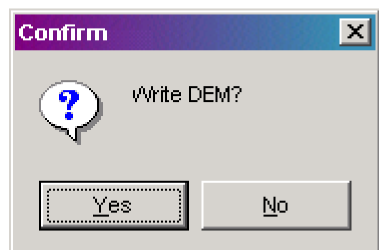


Select SUBSET to bring up the product subset menu.



Select IRREGULAR DEM. This will bring up the Open New DEM window where you will navigate to the specific elevation file you wish to subset. Once you've selected the file it will be displayed in MicroDEM.

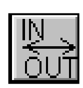
Click on the elevation display with the mouse pointer to erase the elevation data you wish to delete. This acts just like an erasure function in a drawing program, be careful there is no undo option to correct mistakes. Once you've erased the data go to the Main Menu and select FILE / SAVE DEM EDITS. This will bring up a small Confirm window. Click on the <YES> button to accept your edits and write the new DEM.



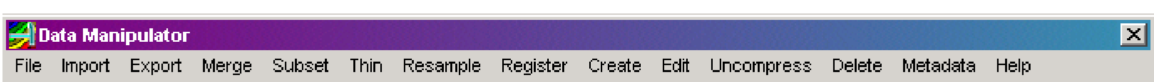
This will bring up the Extracted DEM window where you will designate the location and file name for your new elevation file.

Subset Imagery

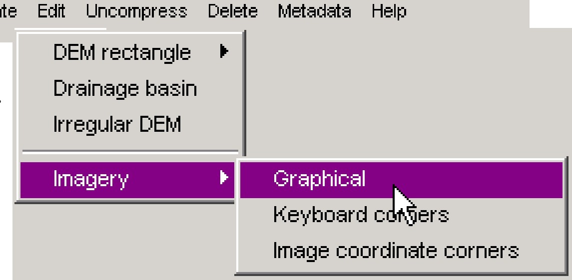
Select the <DATA MANIPUL ATION> button →



This will bring up the Data Manipulator window with the following menu.

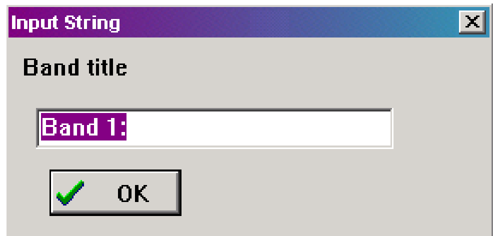


Select SUBSET to bring up the product subset menu.



This will bring up the Open Satellite Image window where you will navigate to and select the specific image file you wish to subset. The selected image will be displayed in MicroDEM.

Click on the northwest corner of the subset area and holding the left mouse button down drag to the southeast corner of the desired subset area and release. Once you've identified the area to be subset a New Image window will appear where you will designate the location and file name for the new image file. A Subsetting Band 1 progress bar will be displayed and when completed an 'Input String' window will appear.



Unless you have reason to change the Band Title simply click on the <OK> button to accept the default. Your new subset image has now been saved.

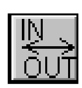
Loading and Displaying Data with the NIMA Database

MicroDEM will allow you to copy NIMA DTED Level 1 and Level 2 elevation data, Controlled Image Base (CIB) 10 meter, 5 meter and 1 meter imagery and Compressed Arc Digitized Raster Graphics (CADRG) map data from CDROM to your hard drive, will keep track of what data you have loaded and will allow you to select and display all the data for an area with a simple one-step procedure.

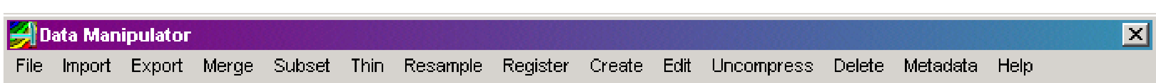
NOTE: For best results the data CDROM must be in the drive before you select the following IMPORT / NIMA DATA FROM CD functions.

Loading Data to the Hard Drive

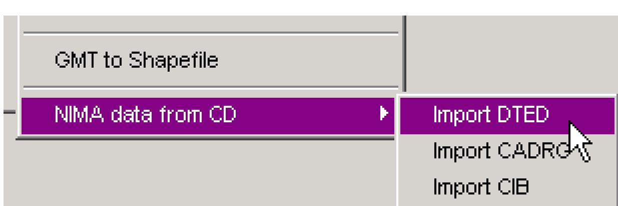
Select the <Data Manipulation> button →



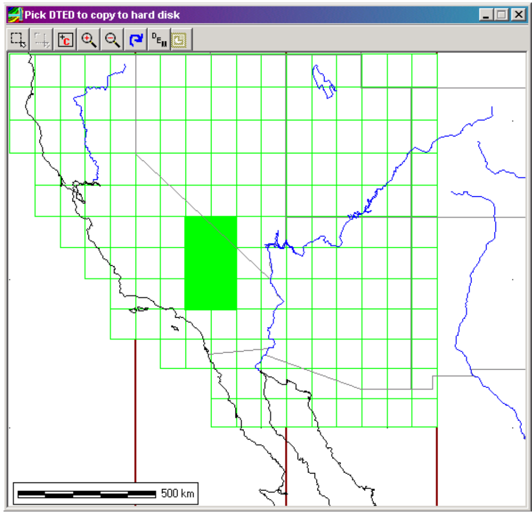
This will bring up the Data Manipulation window with the following menu bar.



Select IMPORT / NIMA DATA FROM CD and IMPORT DTED from the drop down menu.

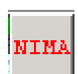


This will bring up the Pick DTED to copy to hard disk window which displays footprint of the data available on the CDROM over a vector map of the area as shown below.

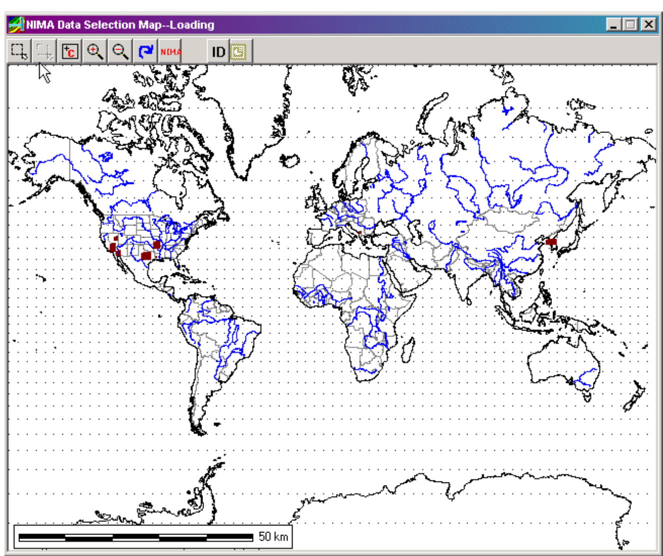


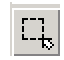
The available areas are within the green border cells with white backgrounds while the solid green cells are those you have already loaded. Brown vertical lines identify six degree wide UTM zones. Select the area you wish to load by clicking on the northwest corner of the area, holding down the mouse button and dragging to the southeast corner of the area you wish to load.

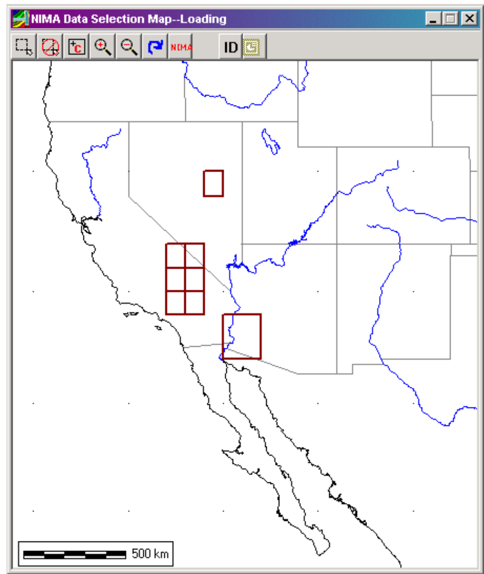
Displaying Data

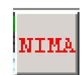
Select the <NIMA> button from the Main Menu GUI → 

This will bring up a world vector map with the footprint of all the data you have loaded to your NIMA database.



Click on the <Subset & Zoom> button on the world map display → 
And select the region you are interested in.



Select the area you wish to display by clicking on the <Select NIMA data> button → 

click on the northwest corner of the area, hold down the mouse button and drag to the southeast corner of the area you wish to load.

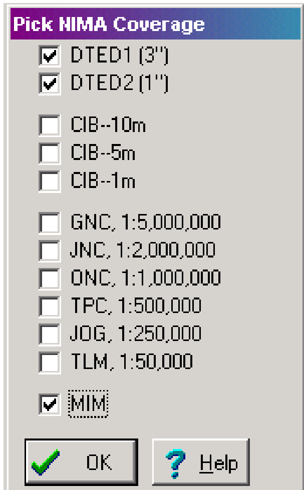
All of the DTED, CADRG and CIB that you have loaded for the area will be redisplayed. Each footprint is a different color to identify the data types and scales.

Series	File Extension§	Name	Scale	Default Color
GNC	GNx	Global Navigation and Planning Chart	1:5,000,000	Navy
JNC	JNx	Jet Navigation Chart	1:2,000,000 and 1:3,000,000	Aqua
ONC	ONx	Operational Navigation Chart	1:1,000,000	Silver
TPC	TPx	Tactical Pilotage Chart	1:500,000	Lime
JOG-A	JAx, JGx	Joint Operations Graphic	1:250,000	Teal
TLM	TLx	Topographic Line Map	1:100,000 to 1:25,000	Blue
MIM	MMx	Military Installation Map		Red
CIB	I1x, I2x	Controlled Image Base		Green
DTED®	DT0,DT1, DT2	Digital Terrain Elevation Data		Maroon

Once you've defined your area of interest (AOI) the data for the area will be displayed.

NOTE: In order to provide greater flexibility MicroDEM allows you to define what types of data will be displayed when selecting NIMA data from your NIMA database. This means that even though you may have elevation data, map data and image data transferred to your hard drive in the NIMA database, only those data types and scales you've check in this window will be displayed and available for use.

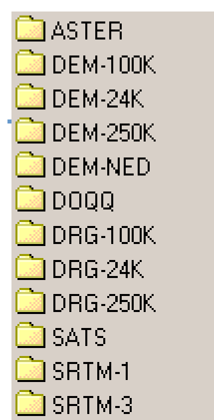
OPTIONS / PROGRAM / <NIMA SERIES> button will bring up the Pick NIMA Coverage window.



Loading and Displaying Data with the USGS Database

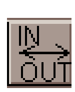
MicroDEM will allow you to copy USGS Digital Elevation Models (DEM), Digitized Raster Graphics (DRG) map data from CDROM to your hard drive, will keep track of what data you have loaded and will allow you to select and display all the data for an area with a simple one-step procedure.

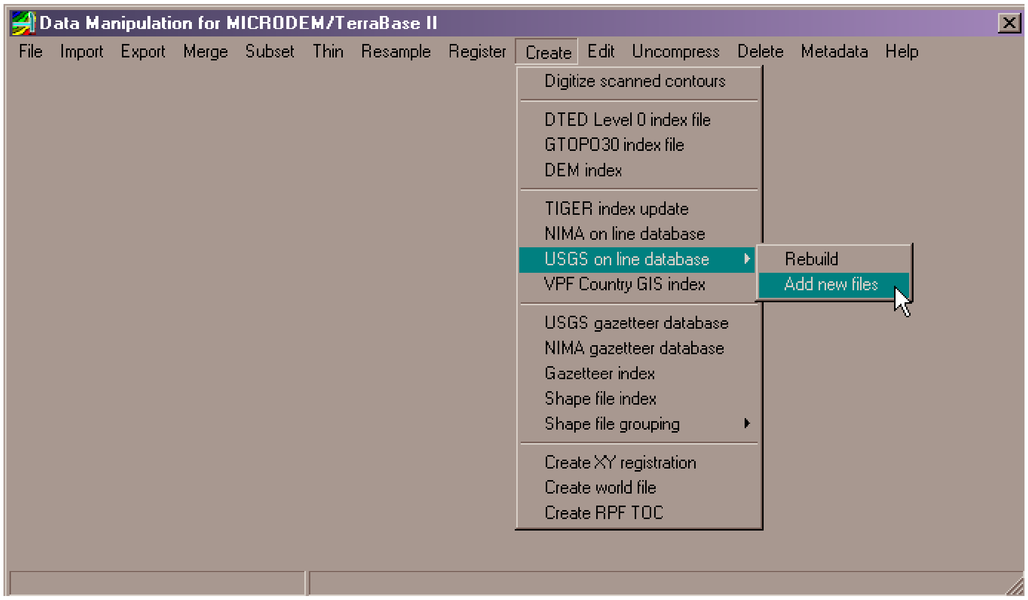
You must manually copy the data from your CDROM to the appropriate directory under ..\MapData\USGS Data on your hard drive. →



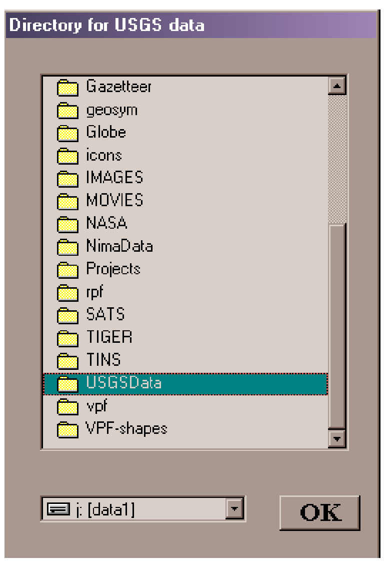
Once you have copied your data you will create an index file to keep track of all the USGS data you have transferred to your hard drive.

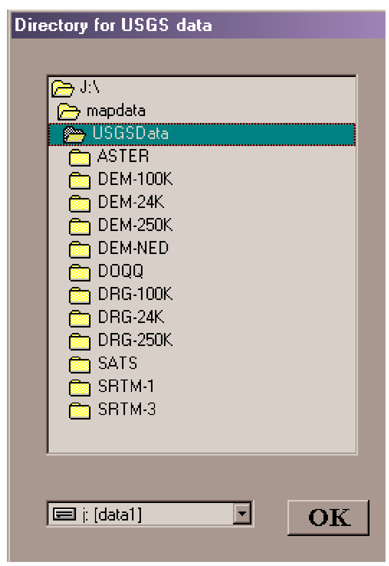
Select the <Data Manipulation> button →





This will bring up the Data Manipulation window .Select IMPORT / USGS ON LINE DATABASE and ADD NEW FILES from the drop down menu.

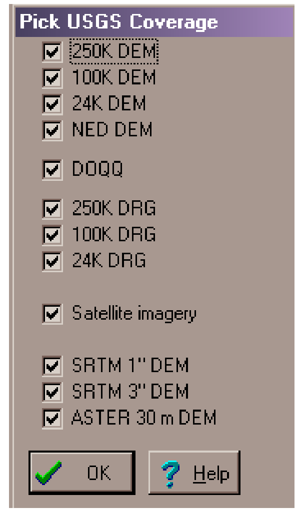


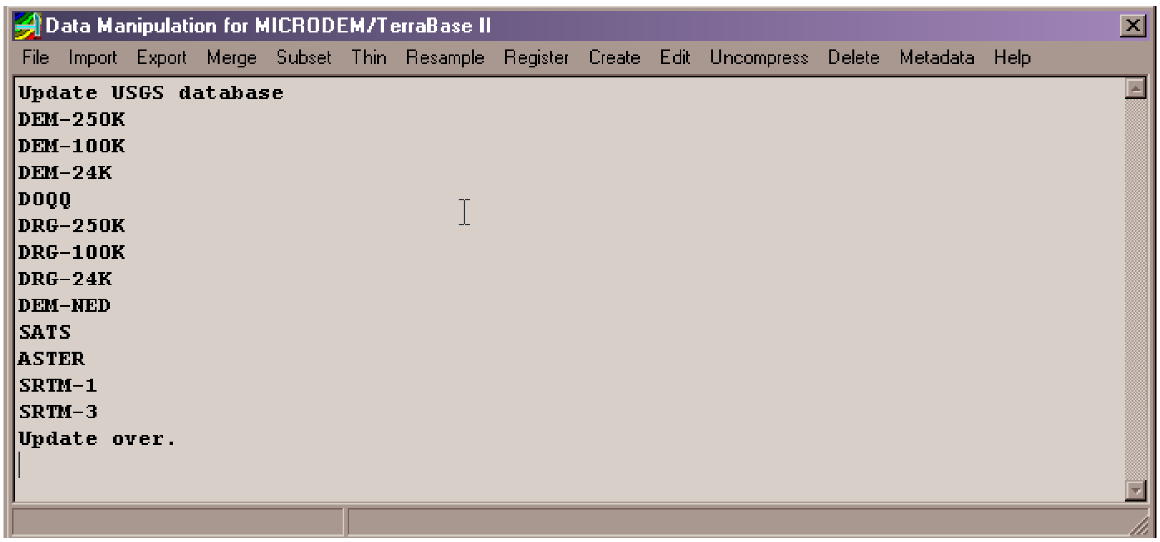


The correct selection of USGSData. The incorrect selection of USGSData.

Navigate to the location of your ..\MAPDATA\USGSDATA directory then click on the <OK> button.

Make sure you have selected all the types of data that you have currently copied to your hard drive, then click on the <OK> button. →

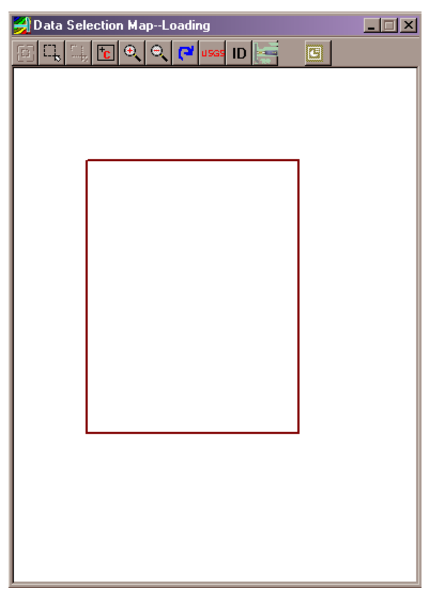




The processing display will notify you when it has completed the update.

The data you have manually imported may be accessed via the <USGS> button located on the main menu bar. →

The footprint of the data will be displayed allowing you to select the specific area of interest. →



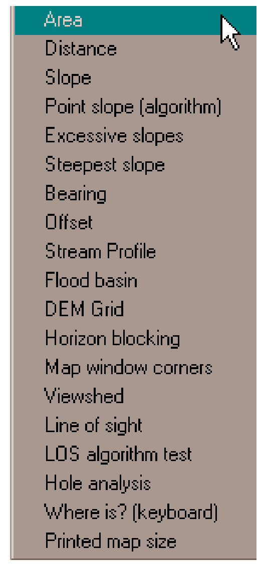
Chapter 4 Mensuration Tools

MicroDEM has a number of tools you can use to perform quick calculations and basic analysis. These tools require elevation data but may also be used on imagery and maps.

Area Measurement

Measures the area within a polygon defined by the user.

On the main menu select CALCULATE to bring up the pull-down menu →

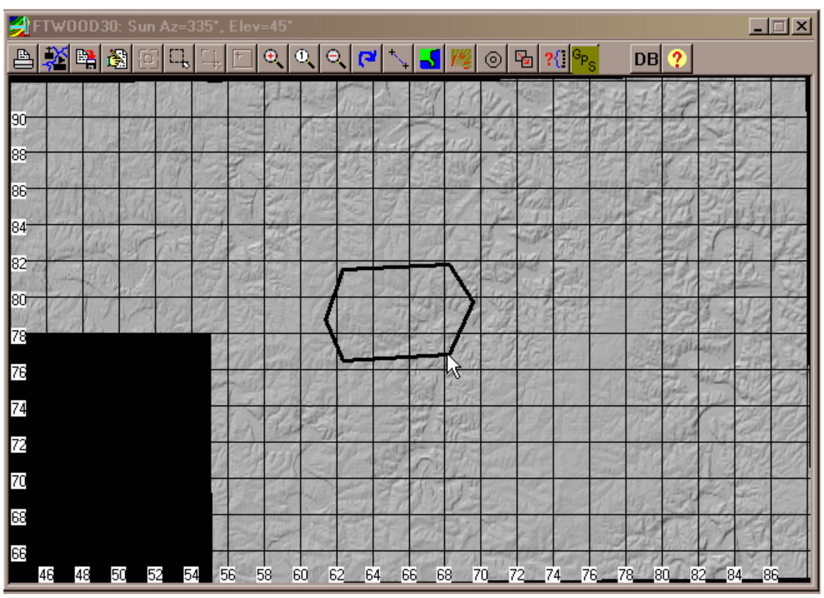


Select AREA from the menu and begin defining your area by double clicking on the display. When you have double clicked the final point,

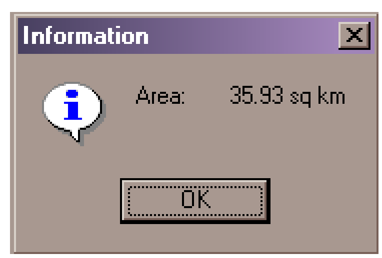
right-click to bring up and select the 

option which

will close the polygon and calculate the resulting area.

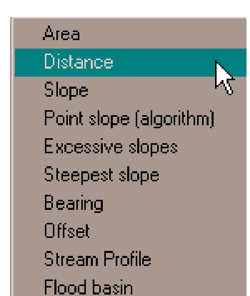


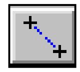
→



Distance Measurements

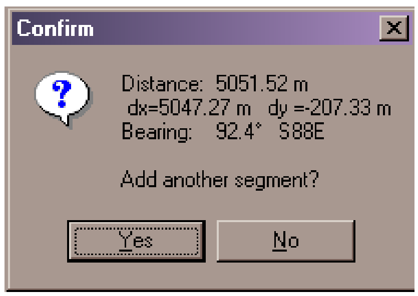
Measures distance between two points on your display.



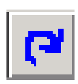
Click on the <CALCULATE DISTANCE> button → 
on the display's menu,

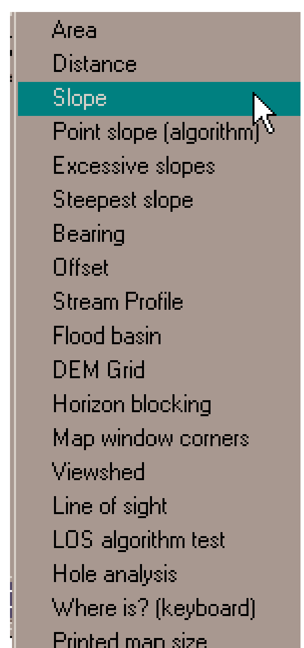
or at the main menu select CALCULATE
and then select DISTANCE from the drop down menu →

Double click on the display at the location of the starting point for the distance or route. Your cursor will now be drawing a reverse-video line. Double click the finish point or first intermediate point or node along your route. A Confirm window will appear giving you that leg's distance, bearing, and cumulative distance and asking if you want to "add another segment ?". Answering <YES> will allow you to continue to add segments along your route.
The length of each segment is displayed along with the cumulative distance from your starting point.



Clean the reverse-video line segments from your display by clicking on the

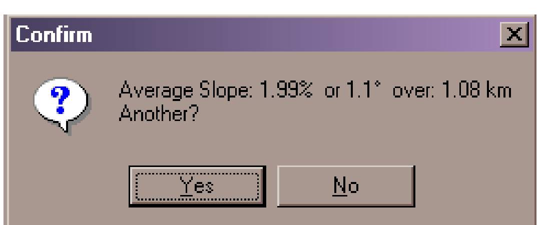
<FORCE REDRAW> button → 



Slope Calculations

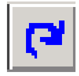
Measures the average slope between two points on your display.
At the main menu select CALCULATE. This will bring up the menu →

Select SLOPE then double click on the start point for the slope. Your cursor will now be drawing a reverse-video line. Double Click on the end point.



A Confirm window will appear which displays the average slope over the distance and asking whether you wish to perform another slope measurement. Each slope measurement is independent. If you wish to continue click the <YES> button. You must identify a new start and end point for each measurement. This function will end when you click the <NO> button

Clean the reverse-video line segments from your display by

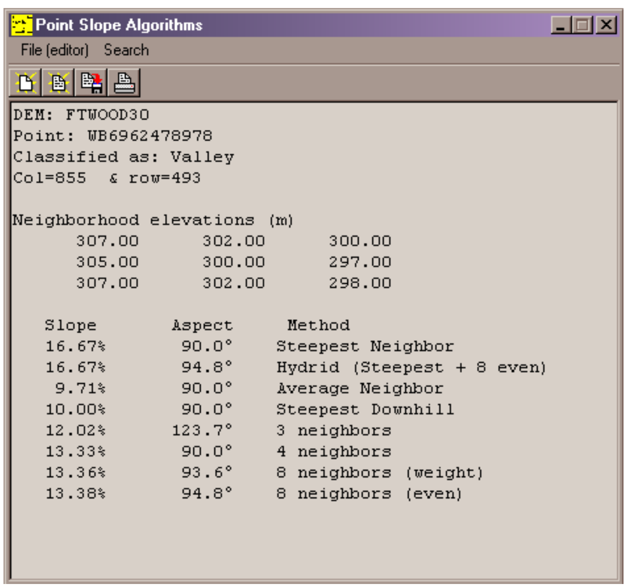
clicking on the <FORCE REDRAW> button → 

Point Slope

Measures the slope to the nearest neighboring grid values.

At the main menu select CALCULATE. This will bring up the drop-down menu from which you will select POINT SLOPE (ALGORITHM) →

Double click on the desired location on your display. The results are displayed in a pop-up Point Slope Algorithms window.

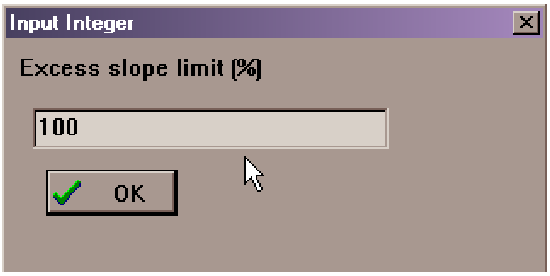


See the section on SLOPE ALGORITHMS in the MicroDEM Help for specific information relative to how the different formulae for two, three, four, eight and nine neighbors calculate slope and aspect.

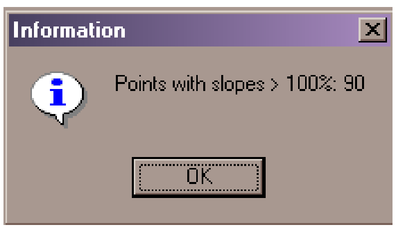
Excessive Slopes

This function will display all points with slopes that exceed a user-defined limit.

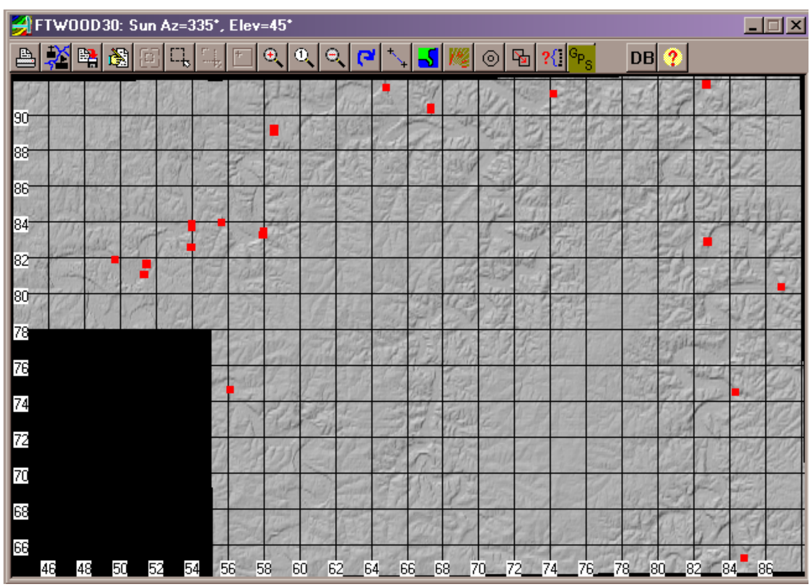
At the main menu select CALCULATE. This will bring up the drop-down menu from which you will select EXCESSIVE SLOPES →



This will bring up the Input Integer dialog. Enter the maximum slope (in percent) and click the <OK> button.



A pop-up Information message box will display the number of points in your data that exceed the stated slope limit.

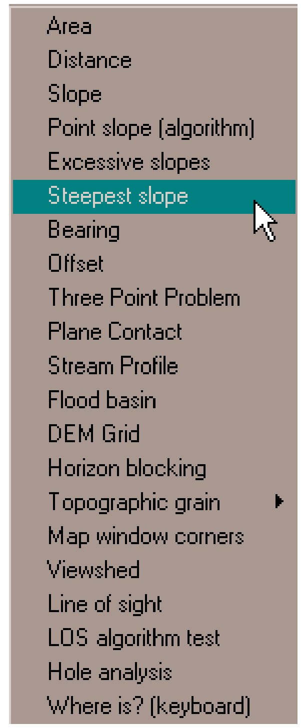


Point symbols are drawn on your display showing the location of all points whose slope exceeds your stated limit.

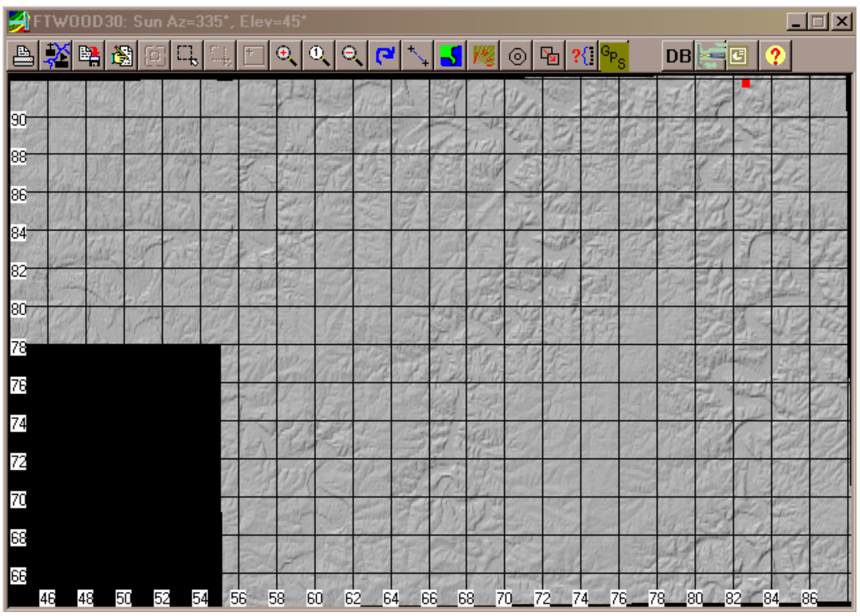
Steepest Slope

Calculates the point on your dataset with the steepest slopes. See the built-in MicroDEM Help section on Preferred Slope Algorithms for a discussion of the various methods used for these calculatations.

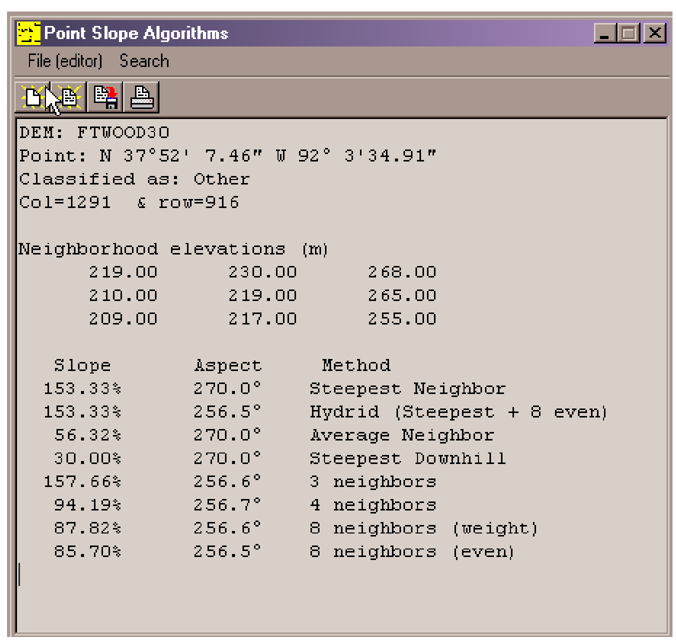
At the main menu select CALCULATE. This will bring up the drop-down menu from which you will select STEEPEST SLOPES →



A point symbol is placed on the point with steepest slope on your display.

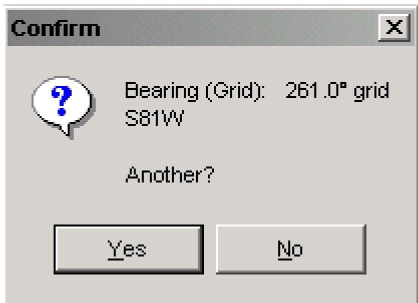


The resulting calculations are displayed in the Point Slope Algorithms pop-up window.



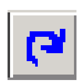
Bearing

Calculates the bearing between two points on your display. At the main menu select CALCULATE / BEARING. Double click on the observer or start point on the display then double click on the target or end point. Notice that a reverse-video line is drawn on your display.



A Confirm window will appear giving you the bearing as both a 360 degree compass readout and in 90 degree quadrant readout such as 261.0 and S81W as shown above. Click on <YES> to calculate another bearing or click on <NO> to end this function.

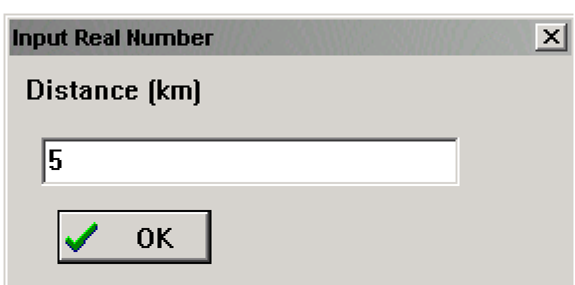
Clean the reverse-video line segments from your display by clicking on the

<FORCE REDRAW> button → 

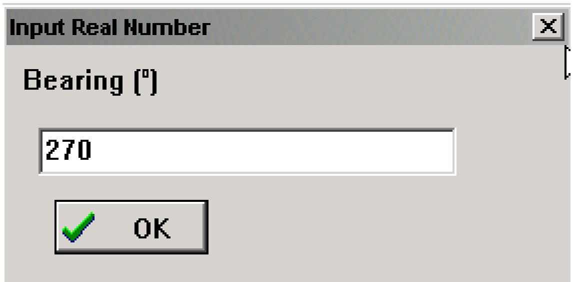
Offset

Plots a line of a given length along the specified bearing on your display.
At the main menu select CALCULATE / OFFSET.

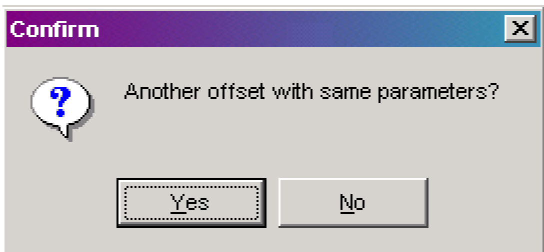
This will bring up a small Input Real Number window. Enter the distance of the in kilometers in the Distance (km) data entry field.



After entering your distance click on the <OK> button. This will bring up another Input Real Number window. Enter the compass bearing.

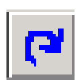


Double click on the start point on your display. This draws a line from a selected starting position for a given distance along the specified bearing. A small Confirm window will appear asking if you want to draw another offset with the same parameters.



If you wish to use the same parameters to draw another offset from another location on your display click the <YES> button and double click on the location on your display. If you do not wish to draw another offset simply click the <NO> button to end the function.

Clean the plotted line from your display by clicking on the

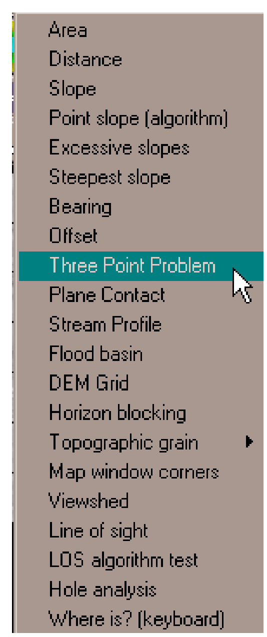
<FORCE REDRAW> button → 

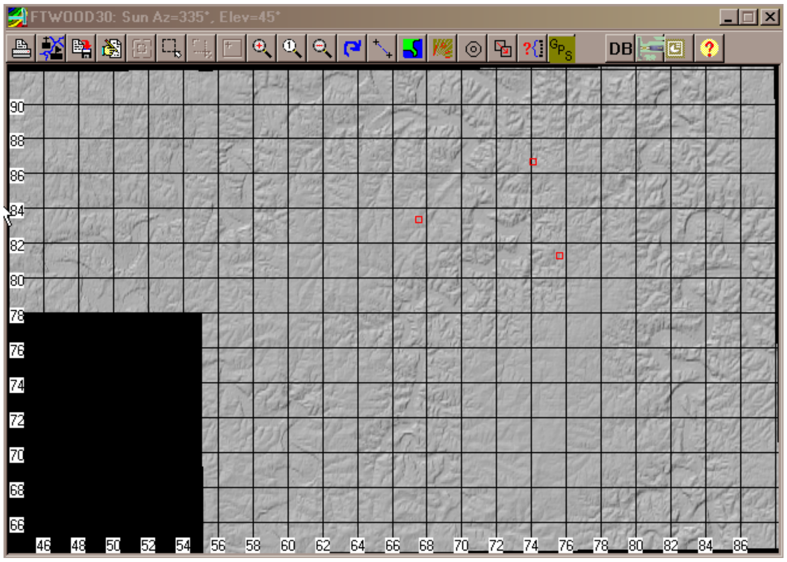
Three Point Problem

This function reports the orientation of the plane, defined by three user selected points, and its slope in percent.

At the main menu select CALCULATE. This will bring up the drop-down

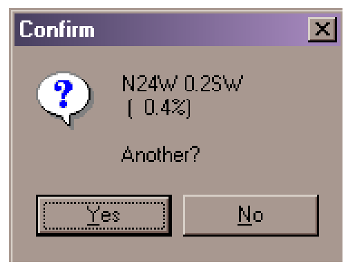
menu from which you will select THREE POINT PROBLEM →





Double click on your display to select the three points to define your plane.

A Confirm popup message box will be displayed with the orientation and slope of the plane defined by your three points.



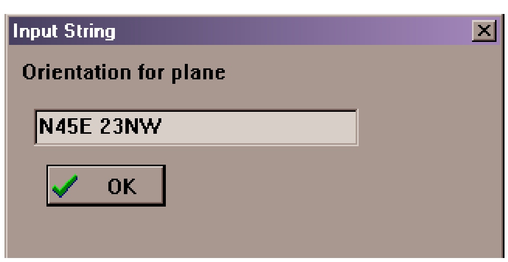
Calculate Plane Contact

Traces the contact of a plane defined by user input of a position, strike and dip orientation.

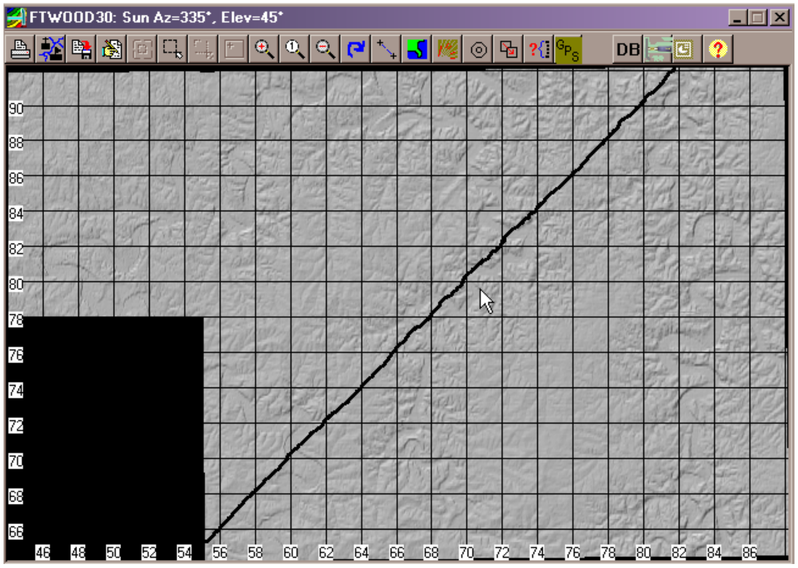
At the main menu select CALCULATE and then select

PLANE CONTACT from the drop down menu →

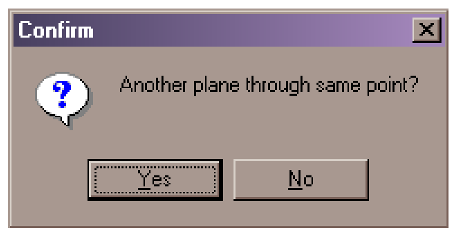
Double click on the desired point on your display to bring up the Input String dialog. Enter the strike and dip of the contact plane according to the format below.



This will bring up the Color selection window where you can select the desired color for you strike symbol →



The contact or strike of your plane is drawn on your display in the selected color and a Confirm dialog window will ask if you wish to define another contact plane through the same point. Select the <NO> button to discontinue processing.



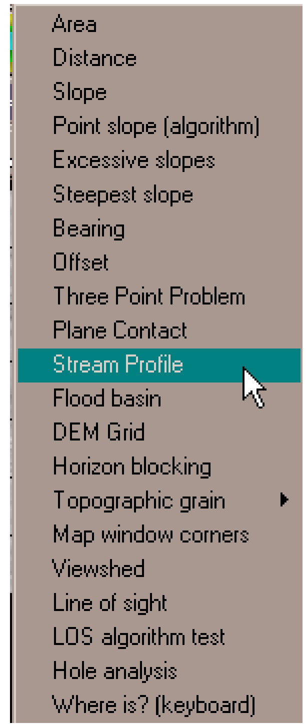
Stream Profile

This option allows you to digitize a stream profile from elevation and image or map data on your display. This function may be used to graph the cross section of any linear feature such as a stream or road. **Be aware** that man made features such as roads will have cuts and fills that may have been created after your elevation data was generated and may not be accurately reflected in your elevation data.

Open both the elevation data and map or imagery for your area of interest and zoom in until you can accurately define your route. If you are using Controlled Image Base (CIB) or Compressed Arc Digitized Raster Graphics (CADRG) don't worry about part of your route being off screen, you can use the scroll bars to access more of your map or image while delineating your path.

If you are using ADRG you must have your entire route visible on the map display. The size of the map subset you display is controlled under OPTIONS/IMAGERY tab and the ADRG X tiles and ADRG Y tiles data entry fields. Each tile is 128 x 128 pixels and the default setting is 8 x 6. A typical 1:50 TLM is about 43 x 46 tiles should you need to display the entire map.

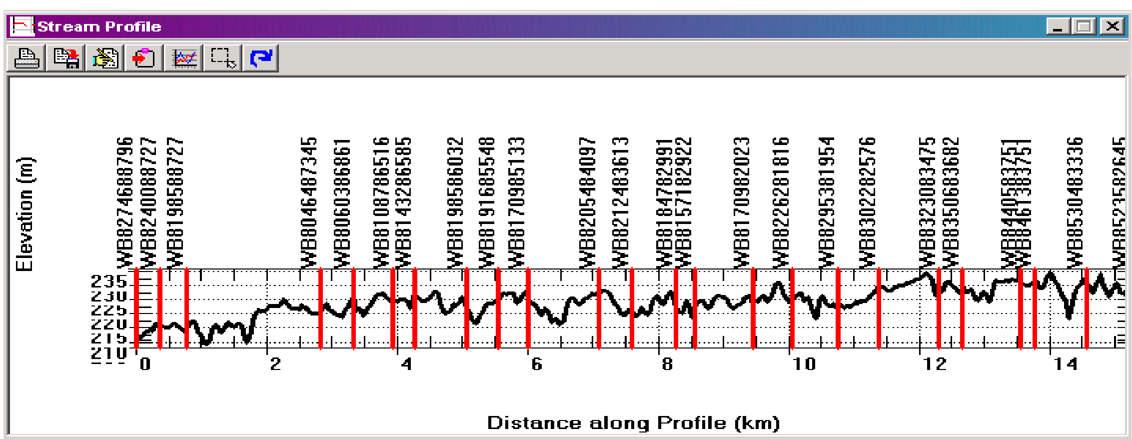
At the main menu select CALCULATE to bring up the menu →



Select STREAM PROFILE from the menu and double click on the starting point for your route or stream. Continue double clicking to identify nodes along your route until your reach the end. Double click to identify the last point in your route then right mouse click to bring up and click on the <u>End Selection</u> menu →

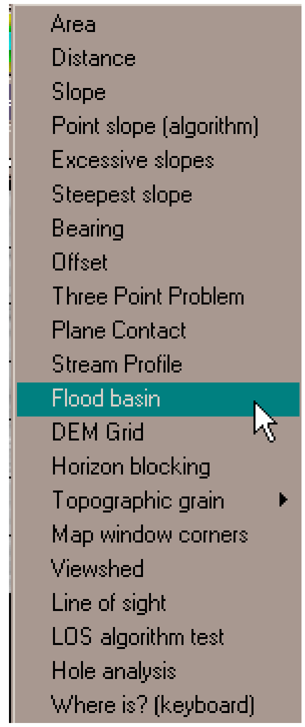
NOTE: You cannot do any other operations while digitizing except zooming in, zooming out and using your scroll bars. All other operations will reset your stream profile and you will have to start over.

The program will draw the profile with the start-point on the left and end-point on the right.



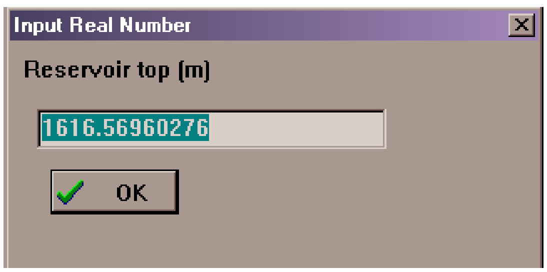
The horizontal scale will show both the distance along the profile and the coordinates of the nodes or intermediate points along the route. The vertical scale shows the elevation relief along the route.

Flood Basin

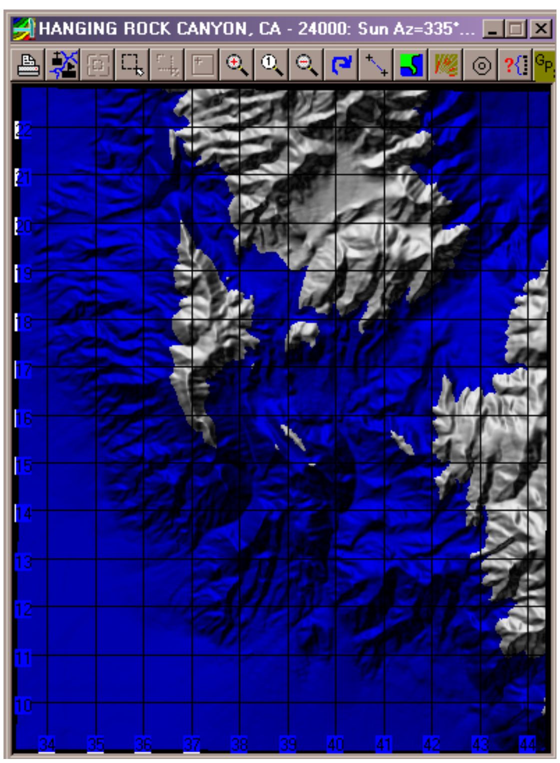


This function will create a mask overlay showing the extent of flooding based on user input of peak flood stage.

At the main menu select CALCULATE to bring up the menu →
Select Flood Basin from the menu. Double click on your display to bring up the Input Real Number dialog. When you double click on your display the elevation value at that point will be entered as the value for the Reservoir top. You may use this value or type another value into the Input Real Number's data entry field.

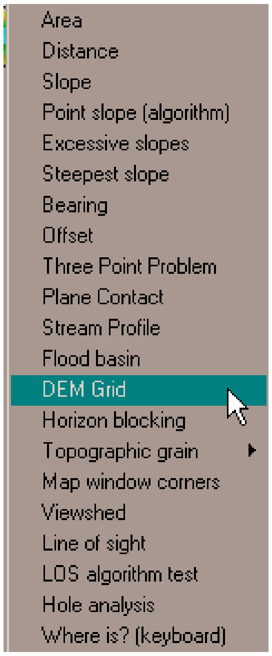


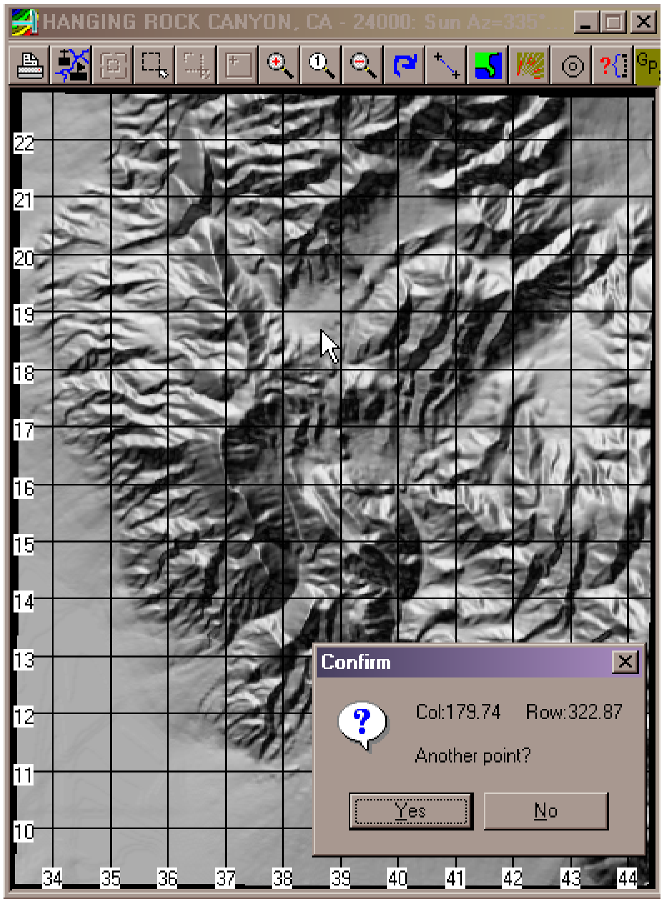
After you click on the <OK> button the flood basin overlay mask will be Drawn on your display.



DEM Grid

This function returns the X and Y grid coordinate for a point selected by double-clicking on your elevation display. At the main menu select CALCULATE to bring up the drop-down menu →

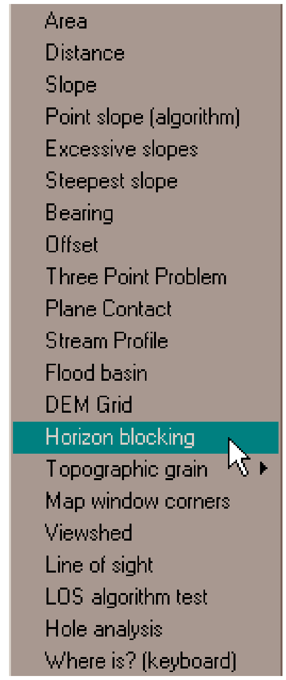




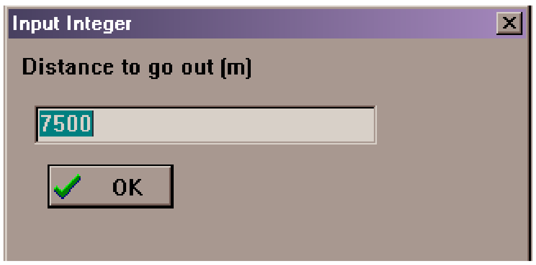
The X and Y values are displayed by column and row in the popup Confirm message. Click on the <NO> button to discontinue this function.

Horizontal Blocking

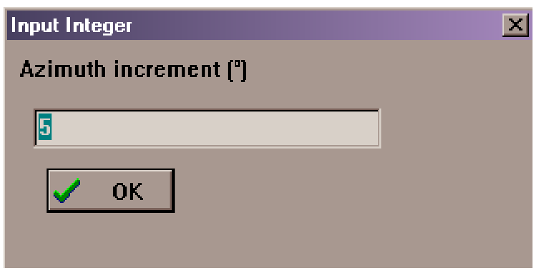
This function will calculate and display the horizontal-horizon from a viewer location selected by the user, based on horizontal distance and azimuth increment.



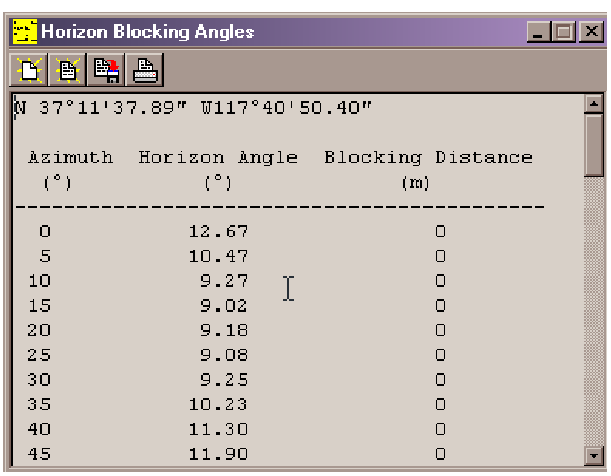
At the main menu select CALCULATE to bring up the drop-down menu → Select Horizon Blocking from the menu. Double click on the display at the viewer's location. This will bring up the Input Integer dialog box where you will type the distance in meters.



Click on the <OK> button to close this dialog and bring up the next Input Integer dialog box where you will type the azimuth increment in degrees.

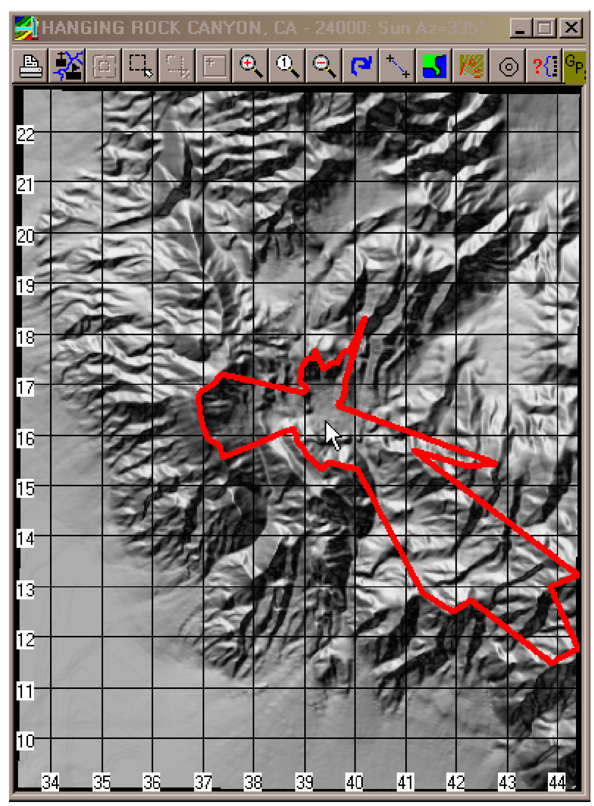


Clicking on the <OK> button will process the information and display the outline of the horizon visible at the user selected distance. The table of Horizontal Blocking Angles is also displayed.



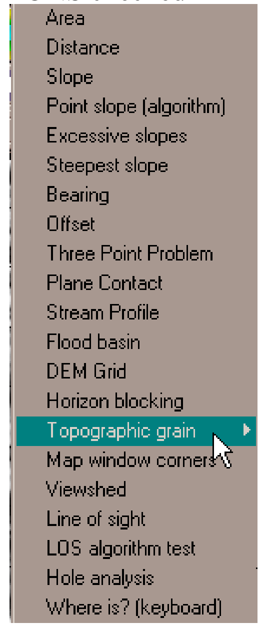
N 37°11'37.89" W117°40'50.40"

Azimuth (°)	Horizon Angle (°)	Blocking Distance (m)
0	12.67	0
5	10.47	0
10	9.27	0
15	9.02	0
20	9.18	0
25	9.08	0
30	9.25	0
35	10.23	0
40	11.30	0
45	11.90	0



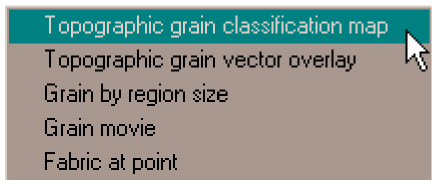
Topographic Grain Classification Map

This function overlays the results of an SSO (Statistical Slope Orientation) diagram for a small region on the current map. The diagram contours the normals to the earth's surface. The data are portrayed on an equal area net, averaged to show the concentration per 1% area on the map. This removes artifacts from the digitizing process (steps in the slope values calculated) and in plotting to the net. Note You must have OPTIONS/MENU CHOICES/GEOLOGY OPTIONS checked for these functions to be available in your menu.

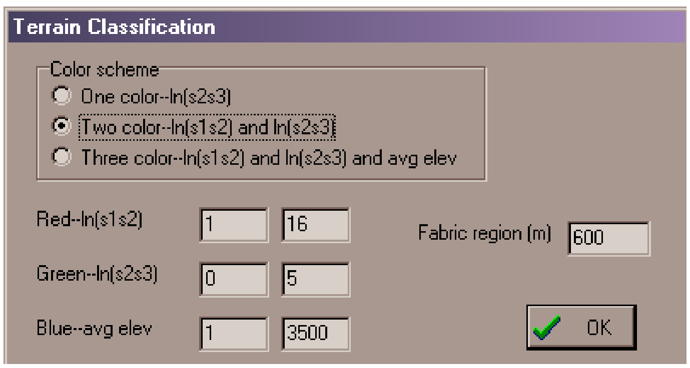


At the main menu select CALCULATE to bring up the drop-down menu →

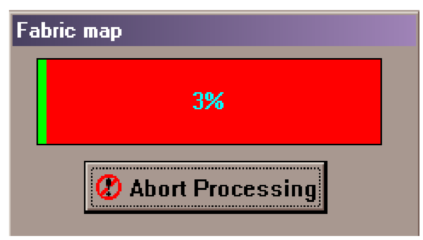
Then select Topographic grain classification map →

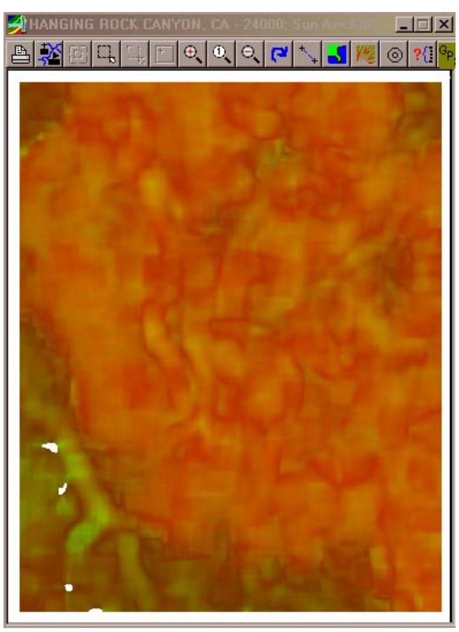


This will bring up the Terrain Classification dialog. Select the type of analysis you require from the available options and click the <OK> button.

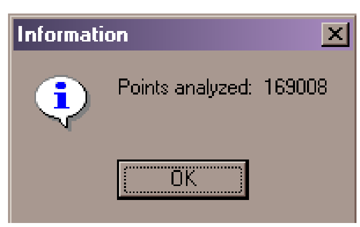


A Fabric Map progress bar will be displayed during processing. The resulting map is generated over your original display.



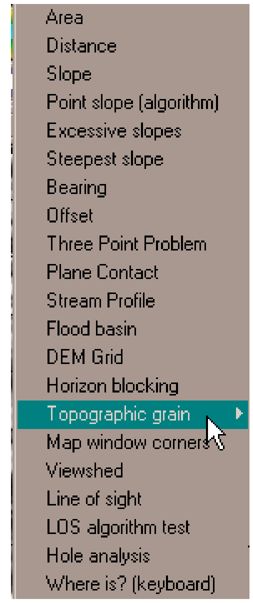


The number of points analyzed is displayed in the Information message box. Click <OK> to close.

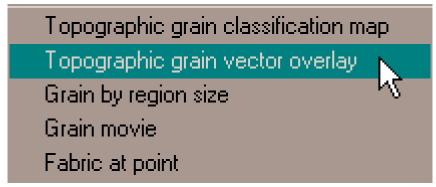


Topographic Grain Vector Overlay

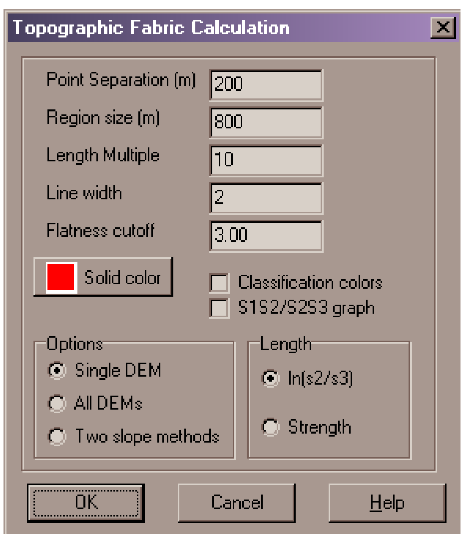
At the main menu select CALCULATE to bring up the drop-down menu →

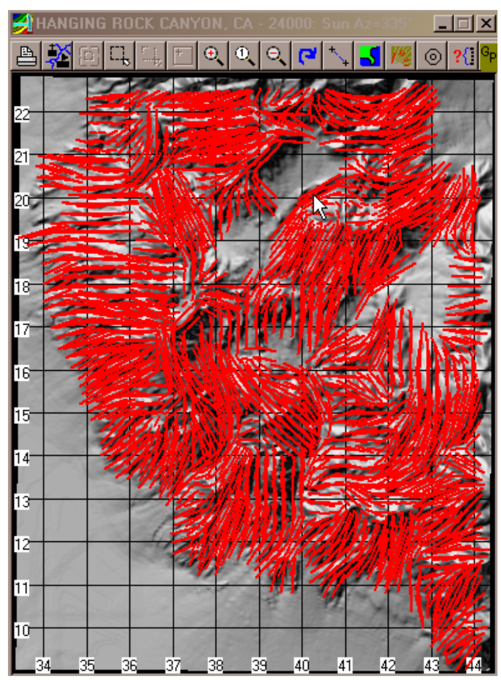


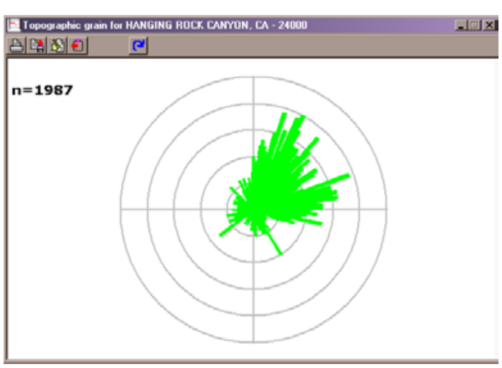
Then select Topographic Grain Vector Overlay →



The Topographic Fabric Calculation dialog window will allow you to set parameters for the vector overlay such as: Point separation: the distance between points at which the grain will be calculated. Region size: the size of the blocks over which the fabric will be calculated. Note Do not make this region too small or you will not get reasonable statistics. Length multiple: scaling factor for the length of the fabric vectors. Width of the fabric lines. Flatness cutoff: flatter points will not be plotted Classification colors uses a two color scheme, with $\ln(S_1/S_2)$ (flatness) and $\ln(S_2/S_3)$ (organization). Solid color lets you select the color. S1S2/S2S3 graph: plot a graph Options: one DEM, All DEMs, or compare two slope algorithms. Length: proportional to $\ln(S_2/S_3)$ (organization) or the strength parameter





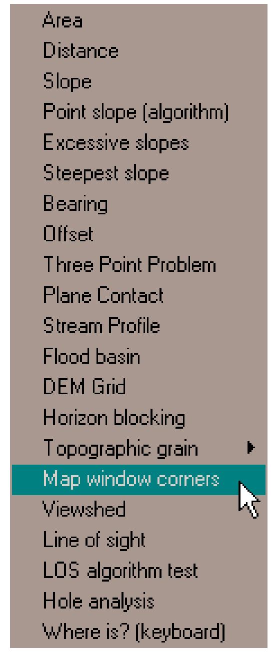


The results of processing are a vector overlay map and an SSO diagram.

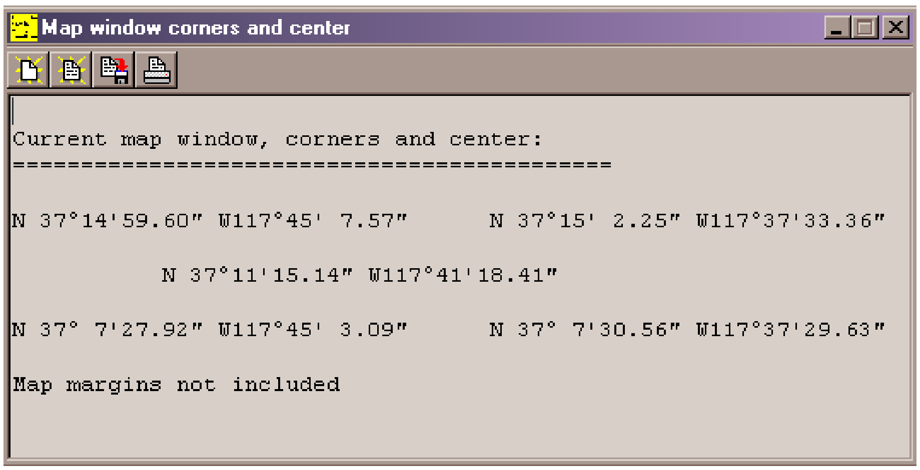
Map Window Corners

This option will calculate and print out the corner and center coordinates of your display in whatever coordinate system you have set as your default (lat/long, UTM, MGRS).

At the main menu select CALCULATE to bring up the drop-down menu →



The results are displayed in the Map Window Corners and Center popup.



View Shed

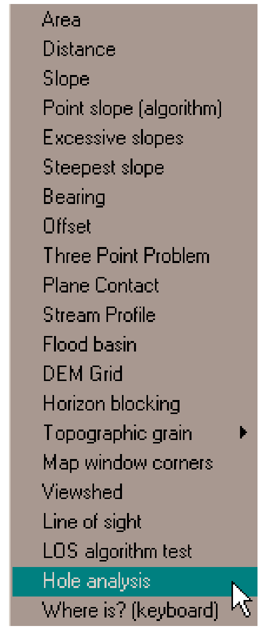
This is the same function as a weapons fan which is covered in **Chapter 7** Tactical Applications.. At the main menu select CALCULATE to bring up the drop-down menu then select VIEW SHED.

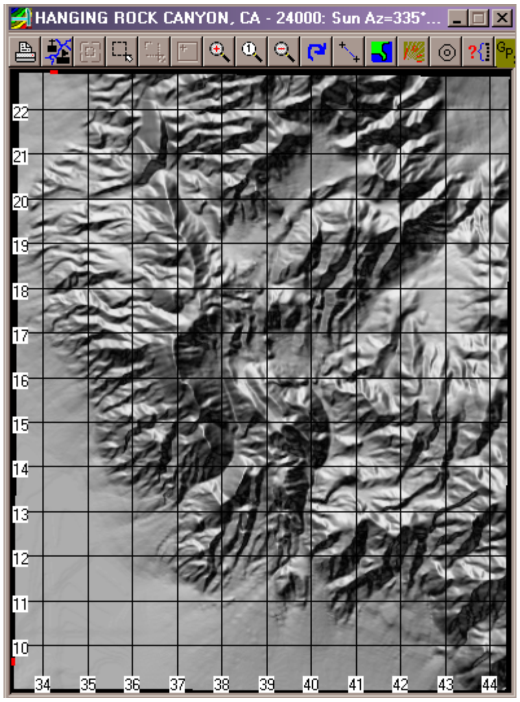
Line of Sight

This function is covered in **Chapter 7** Tactical Applications. At the main menu select CALCULATE to bring up the drop-down menu then select LINE OF SIGHT.

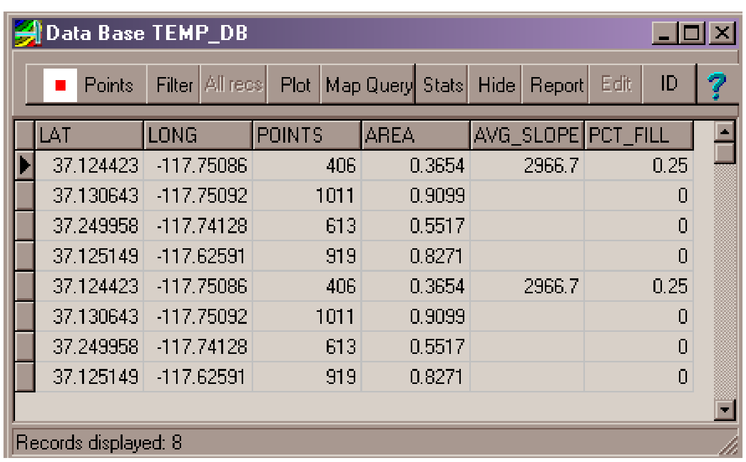
Hole Analysis

This function is useful for determining the number and locations of missing data posts in your elevation files. At the main menu select CALCULATE to bring up the drop-down menu →





The results of processing are displayed as red point symbols on your elevation display and as the number of holes, number of missing elevation posts and the largest hole size in the Information popup message.

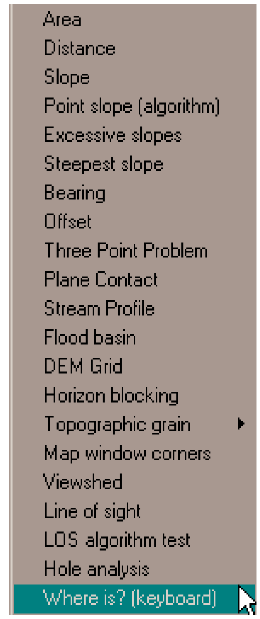


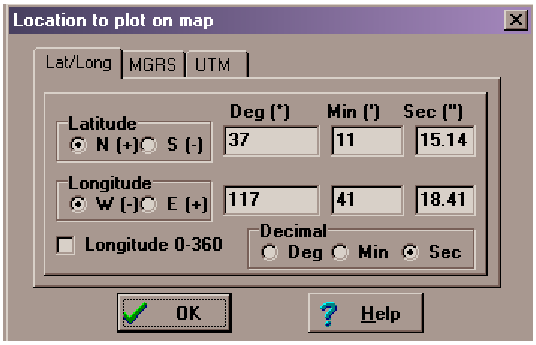
LAT	LONG	POINTS	AREA	AVG_SLOPE	PCT_FILL
37.124423	-117.75086	406	0.3654	2966.7	0.25
37.130643	-117.75092	1011	0.9099		0
37.249958	-117.74128	613	0.5517		0
37.125149	-117.62591	919	0.8271		0
37.124423	-117.75086	406	0.3654	2966.7	0.25
37.130643	-117.75092	1011	0.9099		0
37.249958	-117.74128	613	0.5517		0
37.125149	-117.62591	919	0.8271		0

The locations, point count, area coverage, average slope and percent fill statistics of the missing data are displayed in the Data Base TEMP_DB window.

Where is? (Keyboard)

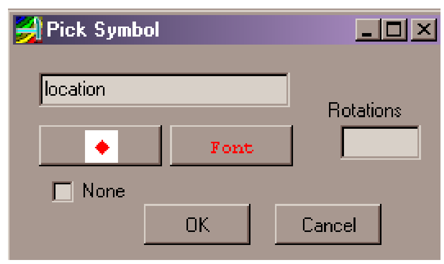
This function will allow you to enter the coordinates of a point via your keyboard and to display its location graphically on your display. At the main menu select CALCULATE to bring up the drop-down menu →

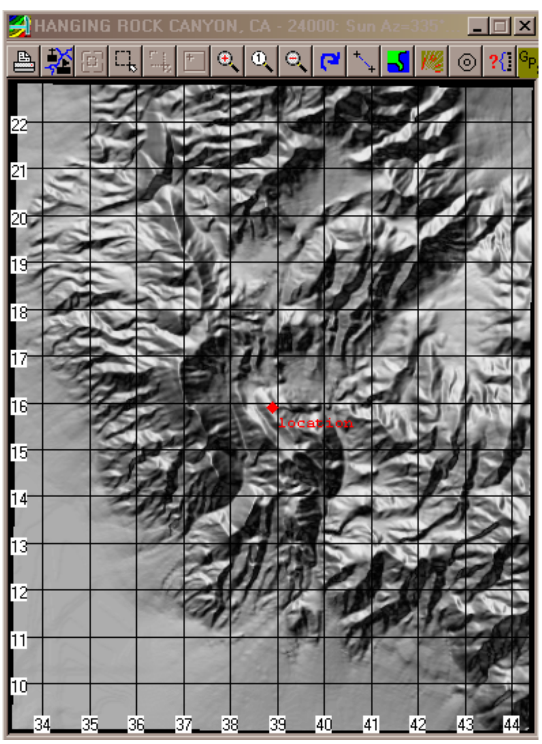




The Location to Plot on Map dialog window will allow you to enter the desired coordinate in the coordinate system of your choice.

After you enter the coordinate and click on the <OK> button the Pick Symbol popup window will allow you to label the point, select a point symbol pattern and color and to select the font type and color for your text.





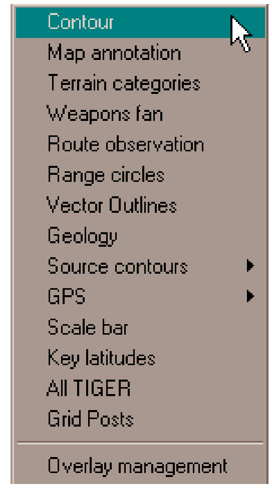
After you click on the <OK> button the point will be plotted on your display and a Confirm popup dialog will ask if you wish to plot another location. Select <NO> to end this procedure.

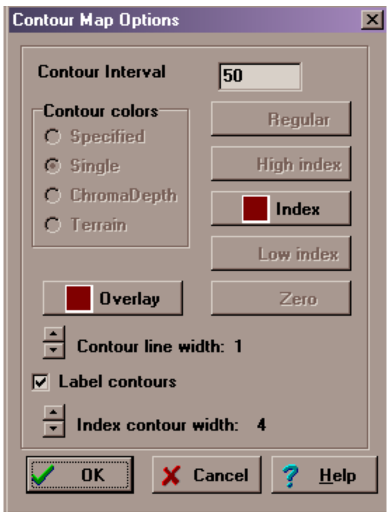
Chapter 5 Overlays

Contours

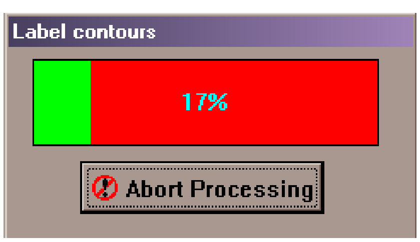
This function allows you to draw elevation contours over any other image or map product that you have coincident coverage of background data and elevation data.

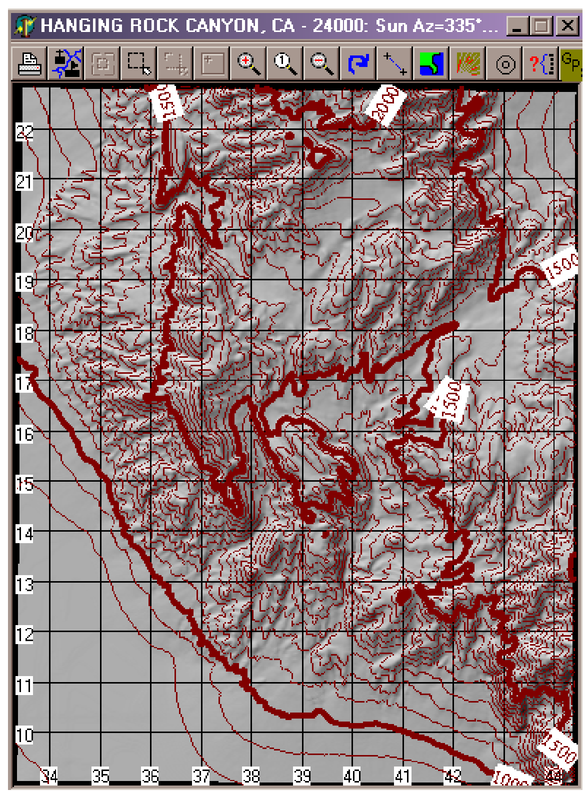
At the main menu select OVERLAY to bring up the drop-down menu →





This brings up the Contour Map Options dialog where you can select the standard contour line color (Overlay) and the index line color (Index), contour line width, index line contour width and whether to label the contours or not. **Note** labeling requires more processing time.





During processing a Label Contours progress bar will be displayed. The resulting contour overlay is displayed over your background data which may be elevation data (as here), imagery or a map.

Map Annotation

This subject is covered in **Chapter 4** Mensuration Tools**.**

Terrain Categories

This subject is covered in Chapter 7 Tactical Operations.

Weapons Fans

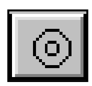
This subject is covered in Chapter 7 Tactical Operations.

Route Observation

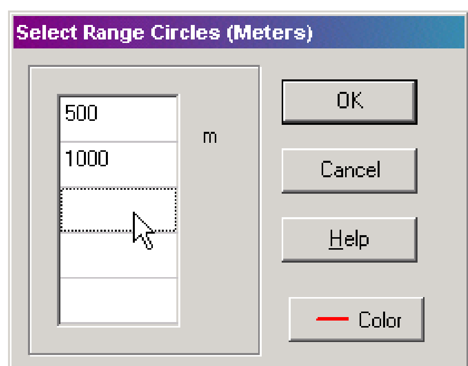
This subject is covered in Chapter 7 Tactical Operations.

Range Circles

This tool allows you to place range circles at specified locations on your display.

Click on the <RANGE CIRCLES> button → 

This will bring up a Select Range Circles window → where you can enter the radius and color for up to five concentric circles.



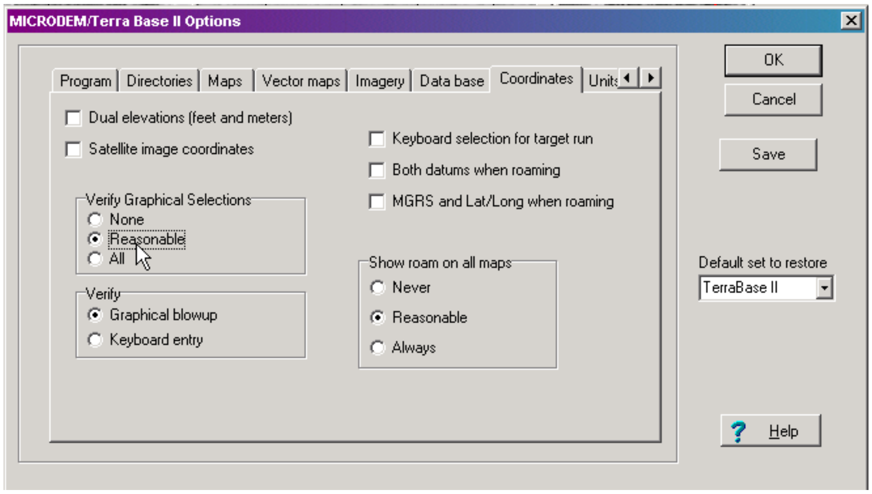
After you have selected the desired ranges and color for your range circles click on the <OK> button to close the window. Double click on the display to plot the range circles with the current settings. **NOTE:** These settings are straight-line distances NOT trajectories.

To remove the range circles overlay select OVERLAY /OVERLAY MANAGER at the main menu. This will bring up the Map Overlay Manager window, see page 6 **Chapter 1**.

HELPFUL HINTS FOR HIGHER ACCURACY POINT PLACEMENT: When using your mouse to graphically select locations for MicroDEM functions, you normally use the 8-digit grid coordinate display at the bottom of your display as your guide. This is quick and easy but may not be as accurate as you need for some functions. Some helpful techniques are to:

a. Overlay your DEM or image with contour lines so it can have a more map like appearance. To do this select OVERLAY / CONTOUR.

b. Select OPTIONS / COORDINATES/VERIFY GRAPHIC SELECTIONS and then select Reasonable as shown below. This will bring up a zoomed-in contour map for the immediate area around your initial selection so you can re-pick the point more accurately.



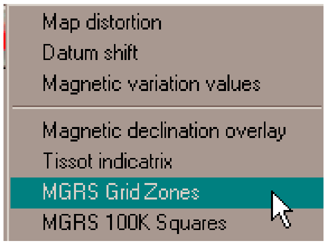
c. Enter the exact grid coordinates from your keyboard. Select OPTIONS / COORDINATES / VERIFY GRAPHIC SELECTIONS / "Reasonable" and Keyboard Entry rather than the default Graphical blowup as seen above.

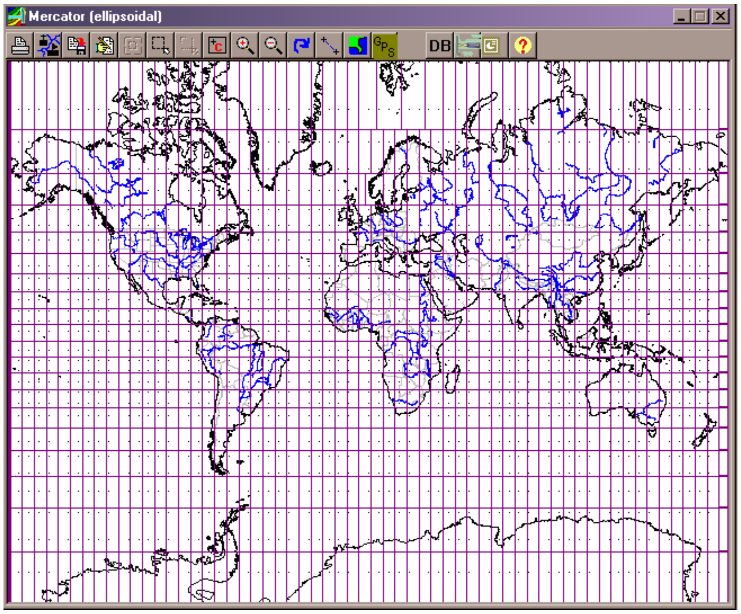
Vector Outlines

These functions are covered in **Chapter 9** Vector Data Operations.

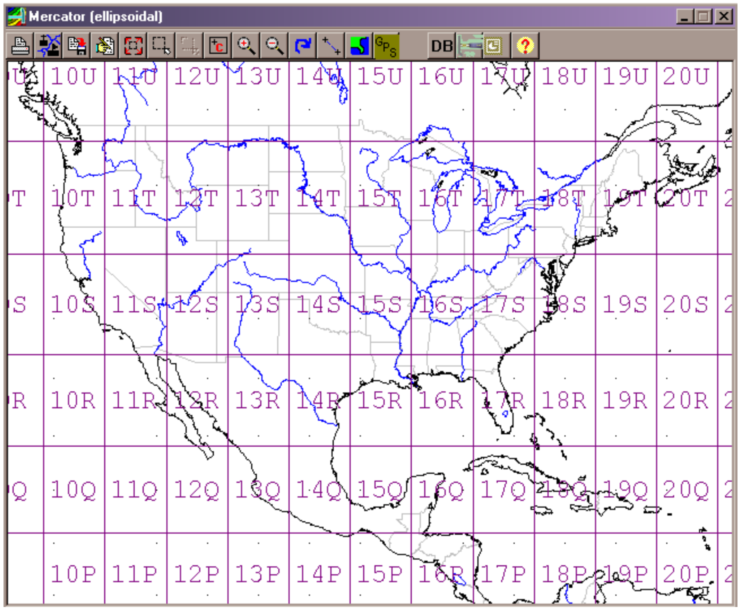
Chapter 6 Grids, Datums and Coordinate Systems

When you need to know the major grid zone and minor grid zone designators for your AOI use the Cartographic functions in MicroDEM. These functions will display the Major Grid and its designators as well as the 100K Grid and its designators over the world vector map or over your current display. At the main menu select CARTOGRAPHY then select MGRS Grid Zones from the drop down menu →

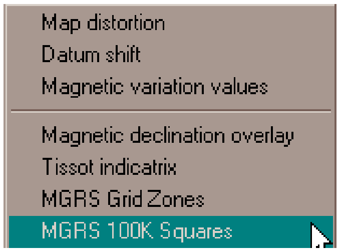


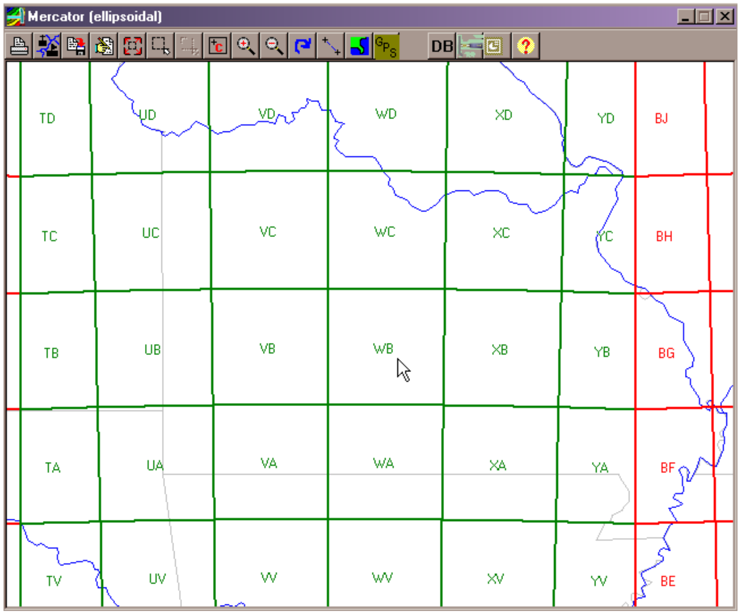


This will overlay your current display with the MGRS Grid. You will need to zoom in to your area of interest to be able to read the grid designation text.



If you wish to overlay the MGRS 100K Grid select MGRS 100K Squares from the drop down menu →



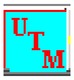


This will overlay your current display with the MGRS 100K grid. You can use the two displays to determine the complete grid prefix for your AOI. Fort Leonard Wood, Missouri falls in grid 15SWB.

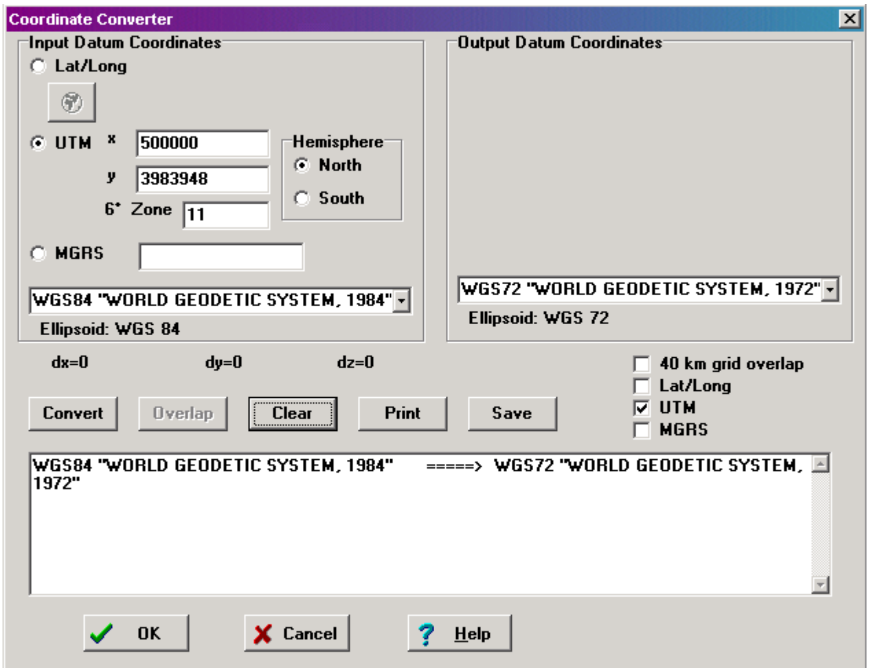
Coordinate Conversion

MicroDEM provides two ways to convert individual coordinates between coordinate systems (lat/long, UTM, MGRS), between datums (WGS-84, NAD27) or between both.

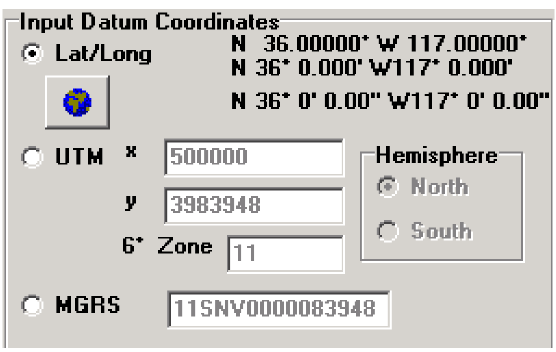
Select the <COORDINATE CONVERSION> button →



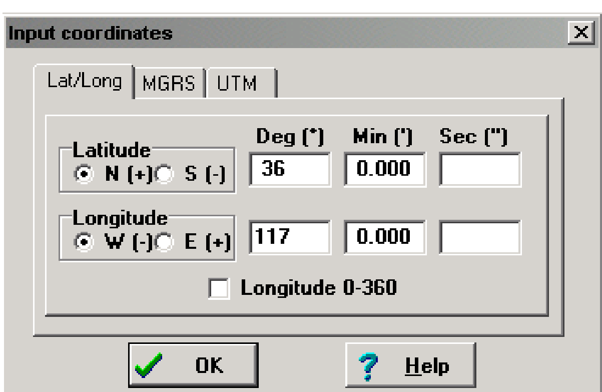
This will bring up the Coordinate Converter window.



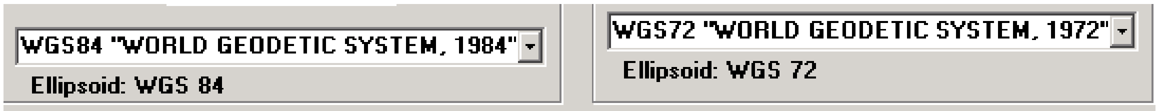
Here you may input the coordinate to be converted as Lat/Long, UTM or MGRS.



If you are entering the coordinate in Lat/Long click on the <Lat/Long> button →
This will bring up the Input coordinates window.



You may convert from one datum to another or to the same datum by selecting the desired input and output datum from the left (input) and right (output) datum selection lists.

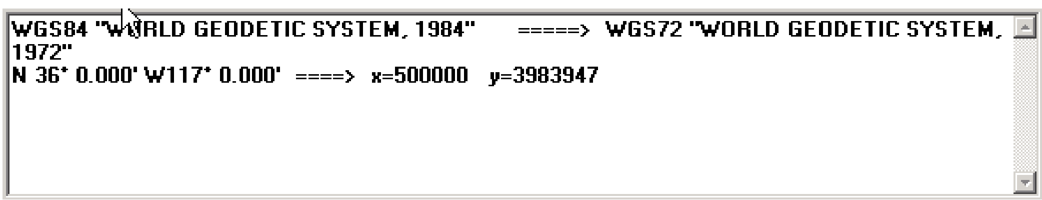


the boxes associated with the desired output format.

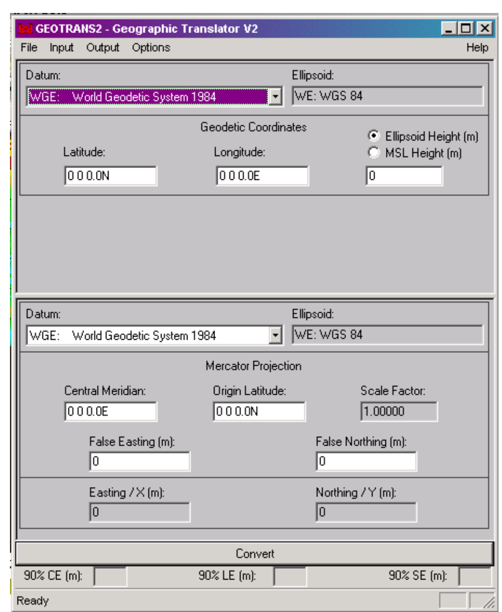
Once you have set both the input and output parameters and entered the input coordinate click on

the <CONVERT> button → 

The output coordinate will be displayed in the selected format and datum in the output field.



GeoTrans



An alternate coordinate conversion module may be downloaded from the NIMA site: http://164.214.2.59/GandG/geotrans/geotrans.html.

Create a geotrans subdirectory in your MicroDEM directory and copy in Geotrans and its associated files. MicroDEM will then offer the <GEOTRANS>

button at the lower right corner → 

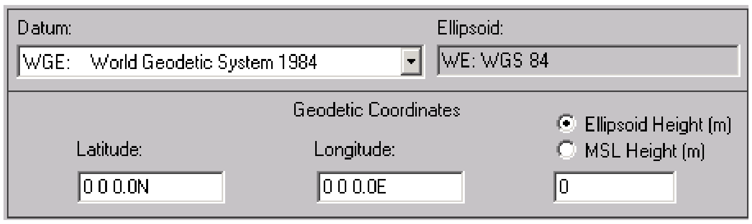
of it's coordinate conversion interface.

This will bring up the GEOTRANS2 – Geographic Translator V2 window.

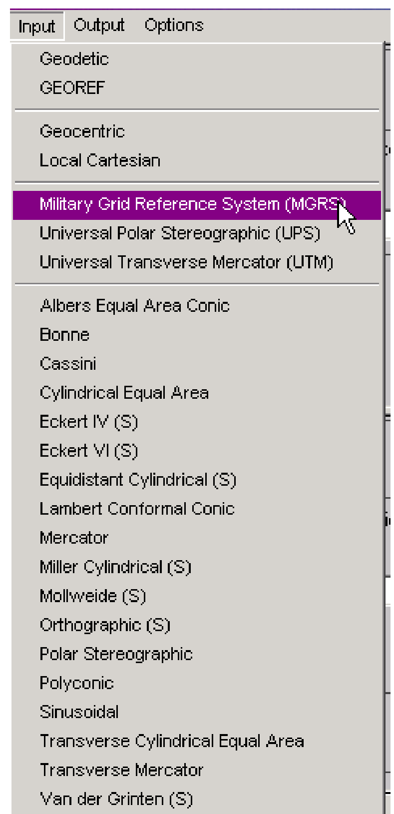
Of course GeoTrans may be run standalone by simply running it's executable.

Both coordinate conversion routines utilize the same NIMA algorithms to calculate the conversion of coordinates. See DMA publications TR 8350.2 and TM 8358.1.
GeoTrans is an Army certified module and has the advantage of additional formats and secondary datums. It is also able to batch process an ASCII list of coordinates.

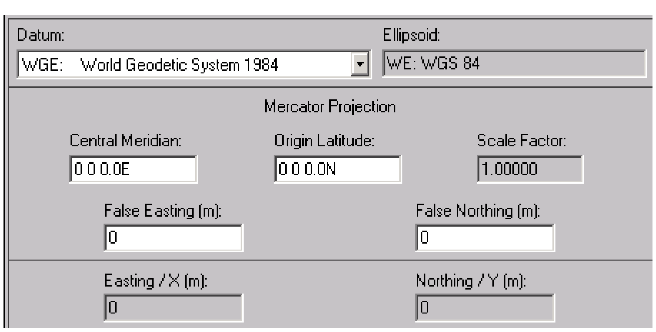
The interface is different but the same input/output parameters must be set in GeoTrans: input datum, output datum, input coordinate format and output coordinate format. Input parameters and data entry field are at the top of the window.



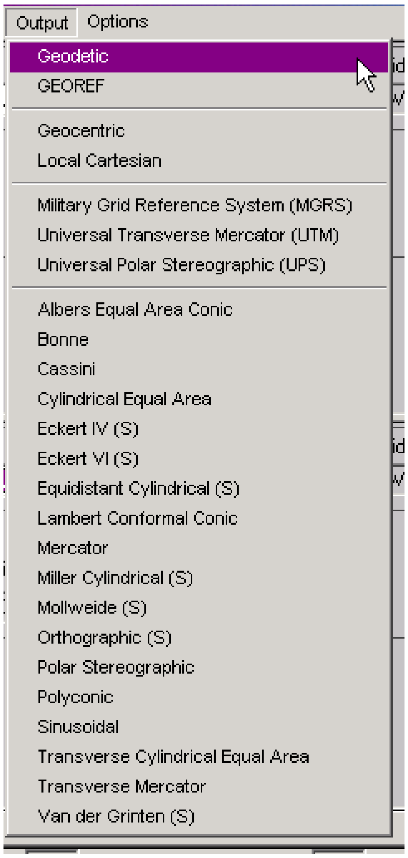
Input parameters may be changed by selecting INPUT from the menu. Selecting GEODETIC allows entry in Lat/long format and GEOREF allows entry in UTM/MGRS coordinate format.



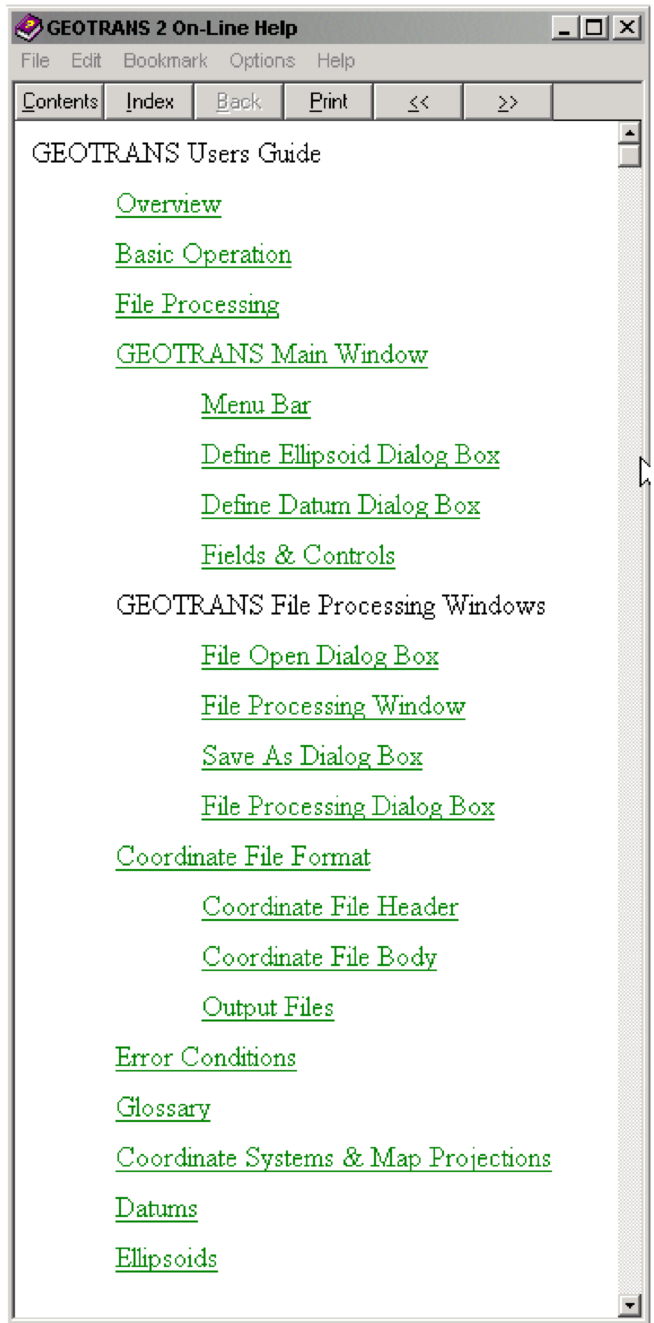
Output parameters and data output fields are at the bottom of the interface.



Output parameters may be changed by selecting OUTPUT from the menu and then selecting the desired output format.



The complete GeoTrans User's Guide is available from the GeoTrans HELP. →



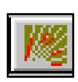
Chapter 7 Tactical Applications

This chapter covers MicroDEM operations that are used for battlefield planning and other tactical applications. There are numerous combinations and uses for each product, you are limited only by your ingenuity and the data available.

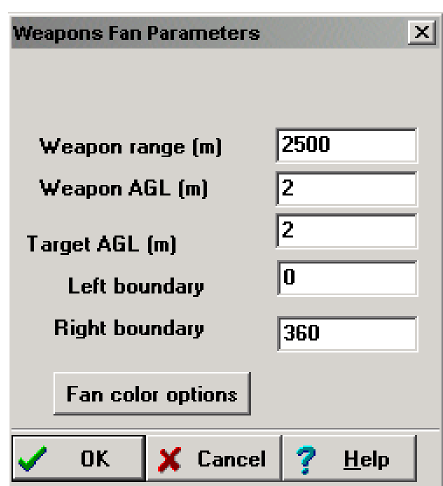
Weapons Fans
Line of Sight and Radio Line of Site
Slope/Cant Maps
Aspect Tinted Maps
Terrain Categories
Oblique Views
Perspective Views
Perspective Live Map Coordinate Display and View Shed 2D Overlay
Fly Through Movies
Live Fly Through with Variable Look Direction
Panoramic View Movies
New Panorama 450 Degree Live View
Circle Around View Movies
Route Observation 'Ambush' Movies
GPS Use with MicroDEM
Satellite Prediction
Trouble Shooting GPS Cable Connections with Hyperterminal
Weather/Climatology
Solar and Lunar Light Data

Weapons Fans

This is an extremely useful and versatile tool for all branches/combat arms to identify enemy/friendly battle positions, template obstacle locations, determine ambush sites, etc. Weapons fans can be drawn over elevation data, imagery and maps, however you must have your elevation data loaded to create these overlays.

Select the <WEAPONS FAN> button → 

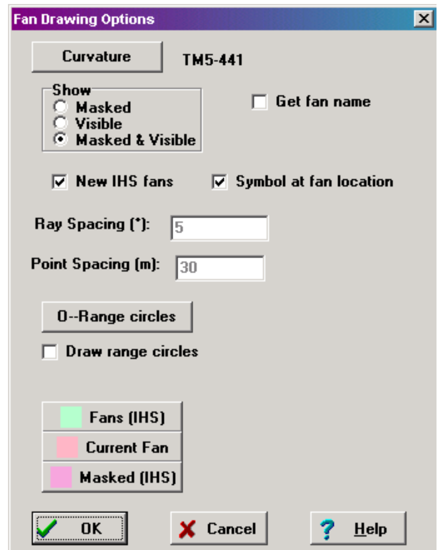
Double click on the display at the desired position for the weapons fan. This will bring up the Weapons Fan Parameters window →



Here you can change the radius or distance for the plot, the weapons elevation above ground level (AGL), the target elevation above ground level and the boundaries. Default settings will create a 360 degree weapons fan.

Clicking on the <Fan Color Options> button → 

will bring up the Fan Drawing Options window.



Here you can elect to create a MASKED area plot, a VISIBLE area plot or a combination MASKED&VISIBLE area plot.

Check the New IHS fans box to create these transparent fans calculated for all points within the fan range. The alternate/old style weapons fans produced only an opaque, masked area plot calculated along specific radials. RAY SPACING and POINT SPACING for the old style weapons fans may be altered by changing the values in their respective data entry fields.

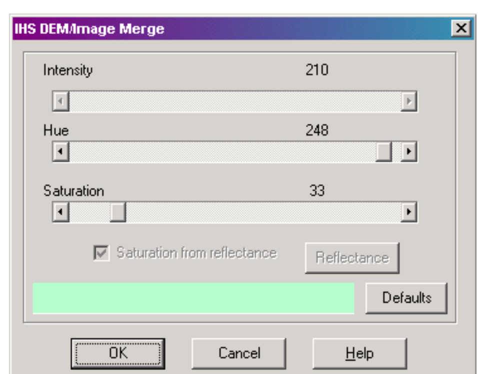
Check the Draw range circles box if you want your weapons fans drawn with range circles.

Click on the <0- Range circles> button → 

This will bring up the Select Range Circles (Meters) window where you can set the range or radius of up to five concentric range circles. See **Chapter 5** page 77 for Range Circles.

Click on the <Fans IHS> button → 

This will bring up the IHS DEM/Image Merge window.



Here you can use the slider bars to control the color and transparency of your visible area weapons fans.

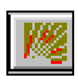
If you have elected to use the old-style weapons fans by NOT checking the New IHS Fans box,

click on the <Fans> button → 

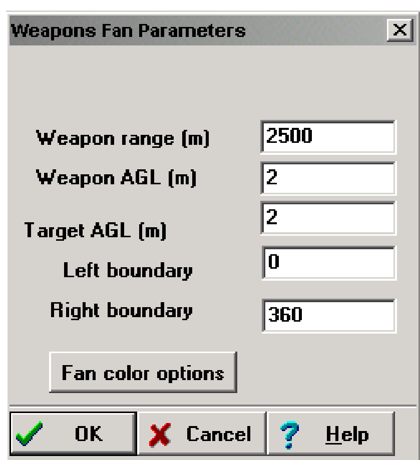
to select the opaque color for your visible area plot from the Color selection pop-up window.

Make sure you've checked the New IHS fans checkbox for now. Click on the <OK> button to close the Fan Drawing Options window. Click on the <OK> button to close the Weapons Fan Parameters window and draw the weapons fan.

This procedure must be repeated to draw another weapons fan.

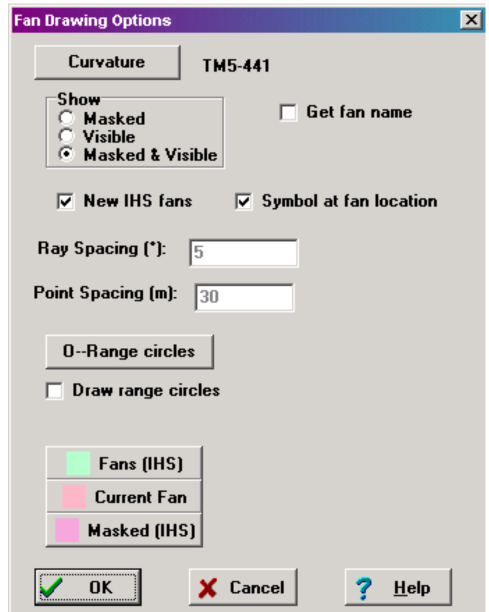
Select the <WEAPONS FAN> button → 

Double click on the display at the desired position for the weapons fan. This will bring up the Weapons Fan Parameters window.

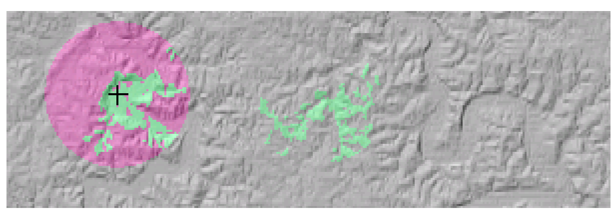


Clicking on the <Fan Color Options> button → 

will bring up the Fan Drawing Options window.



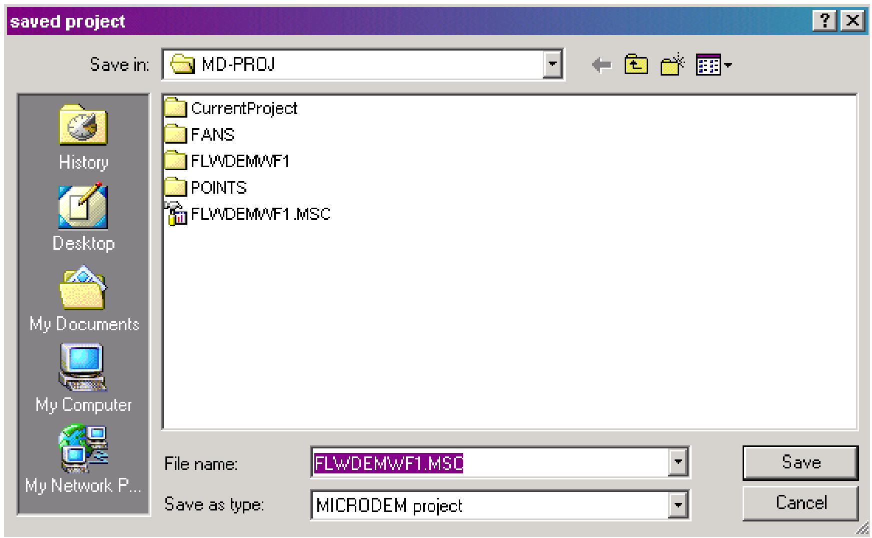
Select the Visible radio button under Show to create a VISIBLE AREA PLOT . Click on the <OK> button to close the Fan Drawing Options window. Click on the <OK> button to close the Weapons Fan Parameters window and draw the weapons fan.



Notice that the new weapons fan is drawn along with the original weapons fan. As each fan is created it is added to the FANS#.DBF database file. **NOTE:** The weapons fans database file is temporarily saved in your MicroDEM directory under the ..\MD-PROJ\Current Project\ subdirectories. These files will be deleted when you exit MicroDEM.

Saving Weapons Fans

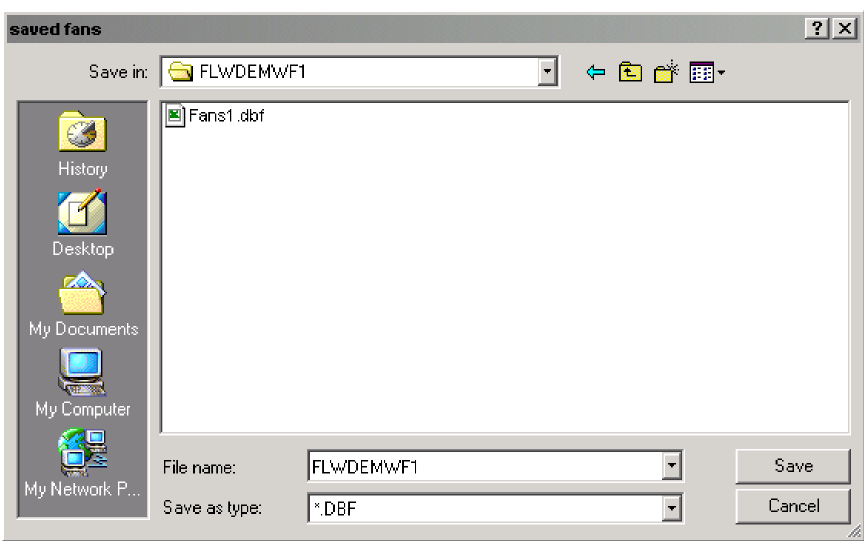
Weapons fans may saved with your project map background by selecting WINDOW / SAVE PROJECT. This will bring up the Saved Project window.



Give your project a suitable name such as 'FLWRaster1' and your weapons fans will be saved as a .MSC file under the \MD-PROJ folder.

An alternate method of saving weapons fans is to select FILE/SAVE WEAPONS FANS at the main menu →

The will bring up the Saved Project window.

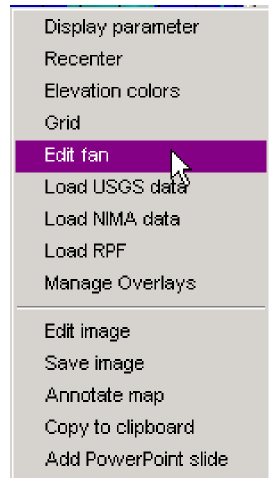


Type a name for a new subdirectory, which will be saved under the \MD-PROJ directory, the weapons fans will be saved as FANS1.DBF in this new folder.

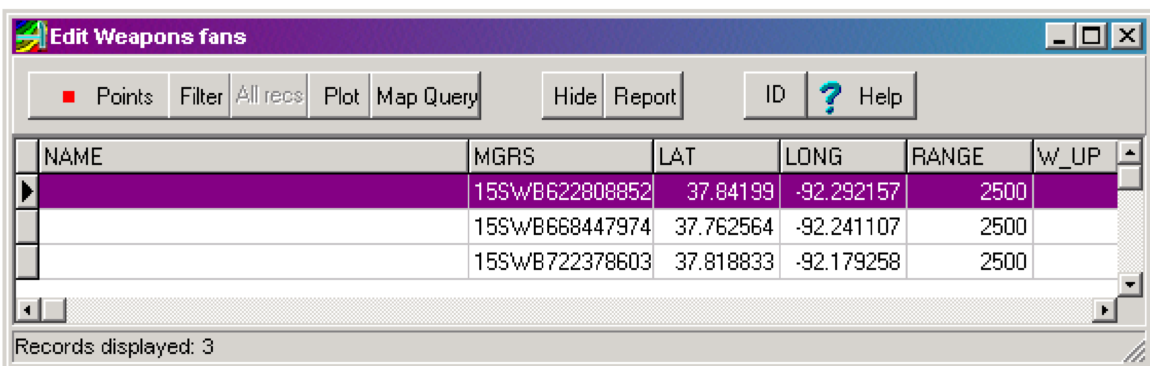
Editing Weapons Fans

Weapons fans may be edited by right clicking on your display and selecting Edit fan from the menu.

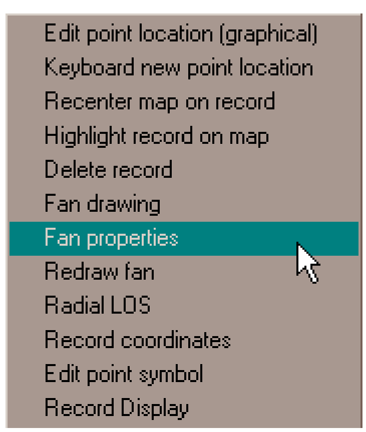
NOTE: You must have the Edit GIS data base box checked under the Database tab in OPTIONS in order to facilitate changes to your weapons fans overlay.



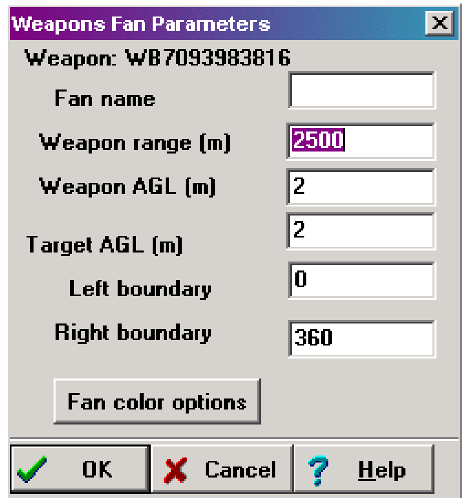
This will bring up the Edit Weapons Fans data base table for your current project.



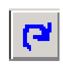
Double click on the record for the weapons fan you need to alter. This will bring up the pop-up menu.

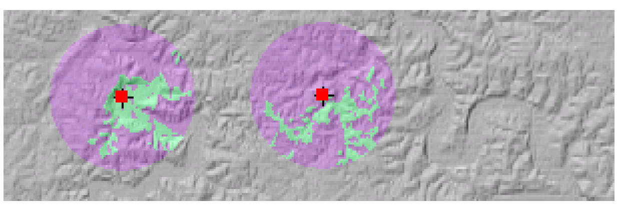


Select Fan properties from the menu. This will bring up the Weapons Fan Parameters window.



Here you will change any of the parameters for this specific weapons fan. When you have made the desired changes simply click on the <OK> button to close the parameter windows.

Click on the <FORCE REDRAW> button on your display →  to redraw your fan.

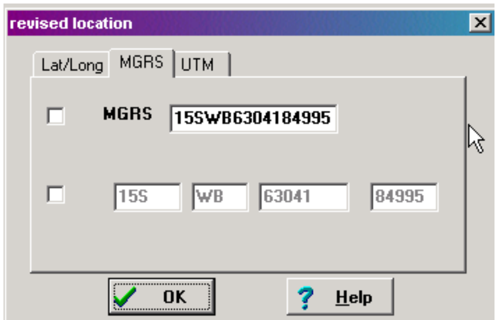


Here I have changed the second fan from a visible area plot to a combination visible and masked area plot.

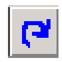
Using this procedure you can also**:** Change the location of the weapons fan, Re-center your display over a selected weapons fan, Highlight the weapons fans associated with a selected record, Delete a record and its associated weapons fan from the database or Record Display.

The location of a fan may be changed either graphically or via keyboard entry of coordinates. Editing graphically is accomplished by simply double clicking on the new position for the weapons fan for the record you initially selected, by double-clicking, on the record from the database table.

Selecting Keyboard new point location will bring up the Revised location window.



Here you will enter the new location for the weapons fan for the record you initially selected, by double-clicking, on the record from the database table.

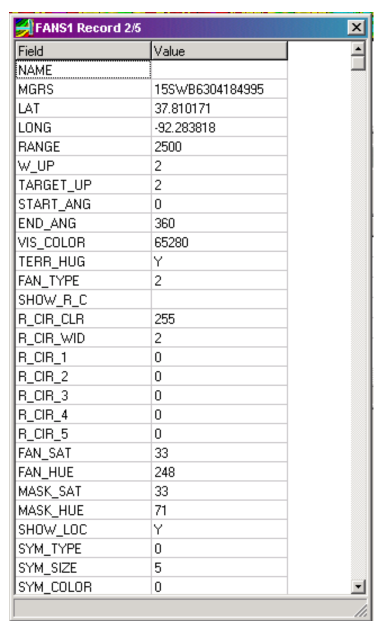
Use the <FORCE REDRAW> button → 

to redraw your display and show the new location for your edited weapons fan.

If you're not sure which record is associated with which weapons fan you can select Highlight record on map and a point symbol will be placed at the center of the weapons fan on your display.

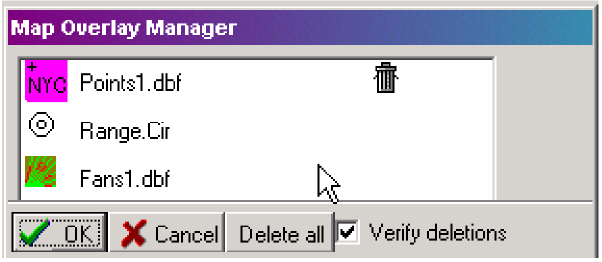
You may delete the record you double clicked on to bring up this pop-up menu by selecting Delete record. A Confirm delete record window will pop-up next, click on the <YES> button to delete the identified weapons fan.

Selecting Record Display from the list will bring up all the information in the database related to the selected weapons fan record as shown below.



Removing a Weapons Fan Overlay from the Display

Weapon's Fan Overlays are removed by selecting OVERLAY / OVERLAY MANAGER at the main menu. This will bring up the Map Overlay Manager window. **NOTE:** If you only have a single overlay you will not get the pop-up Map Overlay Manager, you will simply be asked if you wish to delete the single overlay.



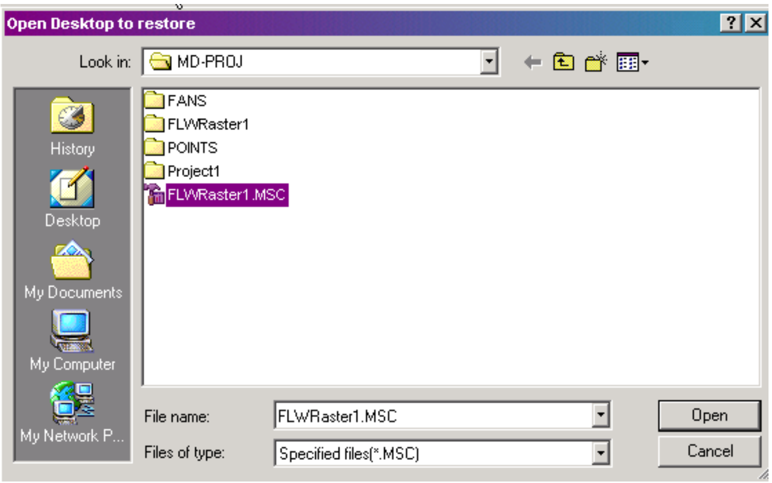
Here you can change the order of the overlays by clicking and dragging each overlay to a different point in the stack. Delete an individual overlay by dragging it to the trash can near the top right corner of the window. Delete all your overlays by selecting the <Delete All> button.

Redisplay of Weapon's Fan Overlays

There are three ways to redisplay your weapons fans.

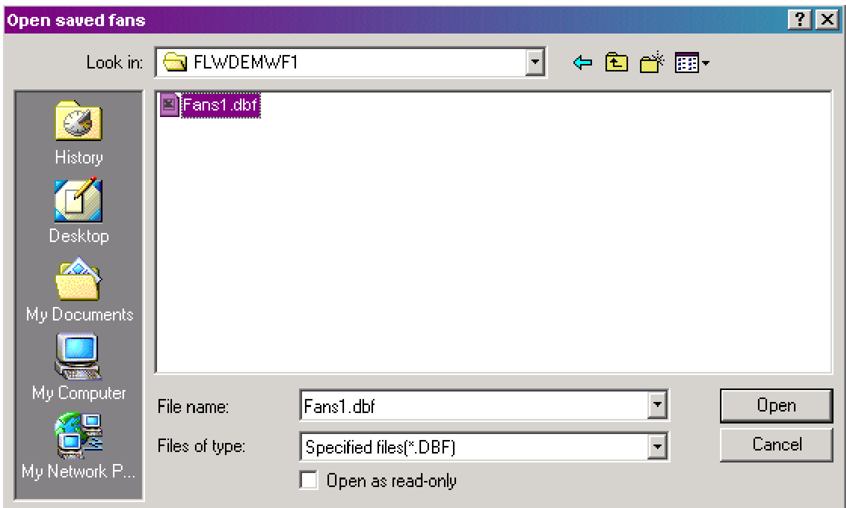
a. Restore Project with associated weapons fans.
b. Load Weapons Fans over your current display.
c. Plot from weapons fans from the database file.

a. Restore a project with its associated weapons fans by selecting WINDOW / RESTORE PROJECT from the main menu. This brings up the Open Desktop to restore window.



Select the desired project (.MSC) file and click on the <OPEN> button. The original project background maps will be displayed along with their associated weapons fans.

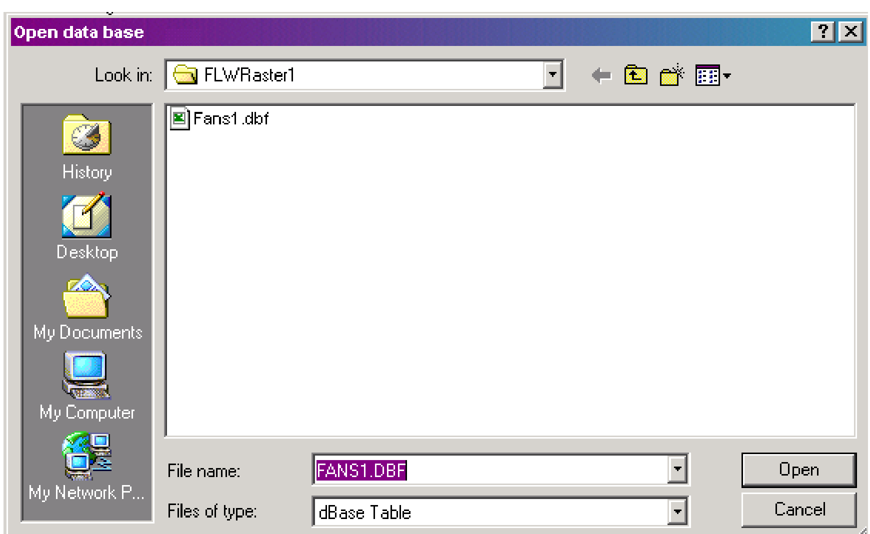
b. Select the elevation, image or map display you wish to use as a back ground map for your overlay. Load the weapons fan overlay over your current display by selecting FILE / LOAD WEAPONS FANS.



This will bring up the Open saved fans window. Navigate to the folder where you saved your weapons fans and select the desired (.DBF) weapons fan file. Once you've selected the desired file and clicked on the <OPEN> button the weapons fans will be displayed over your current display.

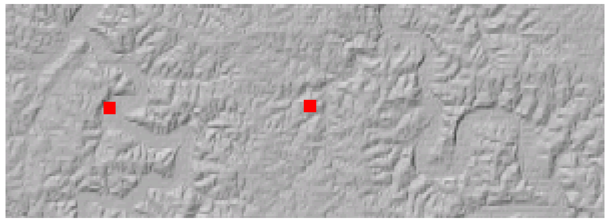
c. Click on the <Data base> button → DB

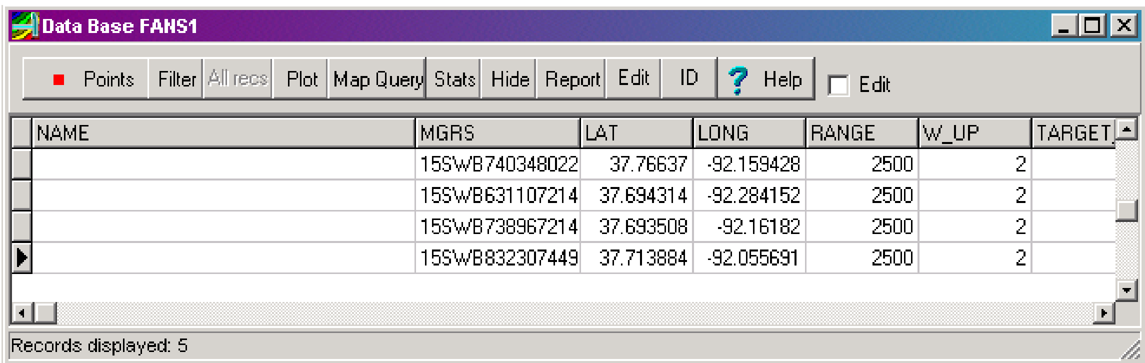
This will bring up the Open database window.



Navigate to ..\MicroDEM\MD-PROJ\ and the directory where you saved your fans and select the FANS1.dbf file.

This will bring up the Edit Weapons fans database table and display the locations of your fans on your background map display.



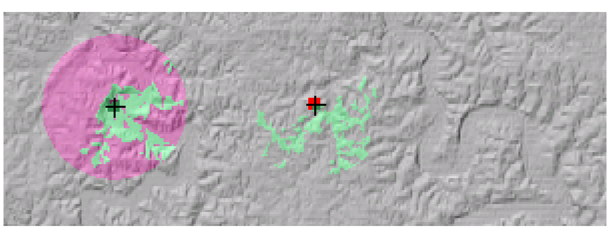


NAME	MGRS	LAT	LONG	RANGE	W_UP	TARGET
	15SWB740348022	37.76637	-92.159428	2500	2	
	15SWB631107214	37.694314	-92.284152	2500	2	
	15SWB738967214	37.693508	-92.16182	2500	2	
	15SWB832307449	37.713884	-92.055691	2500	2	

Click on the <Plot> button → 

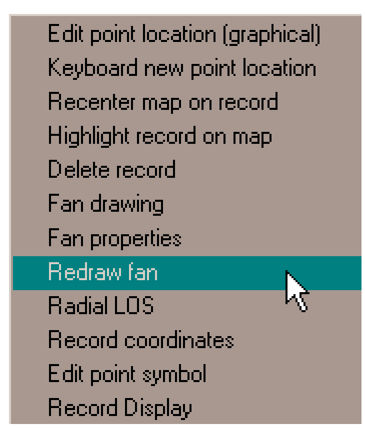
this will bring up the Plot Weapons Fans menu.

Select the PLOT FANS option



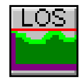
Your weapons fans will be redrawn over your background map.

Individual weapons fans may be replotted from the database by double clicking on its record and selecting Redraw Fan →

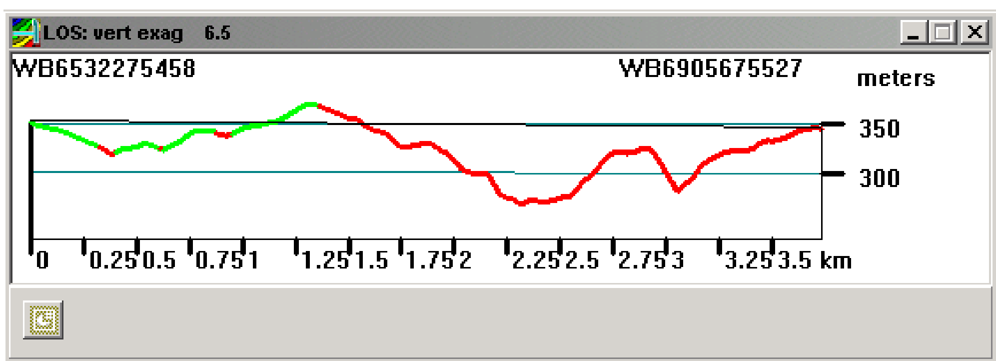


Line of Sight (LOS) and Radio Line of Sight (RLOS)

This tool aids in determining if you have line-of-sight visibility between any two points on your display, however this does NOT take into account the vegetation in the area. The Radio LOS is useful in determining if you have FM communications between the two selected points at the selected frequency.

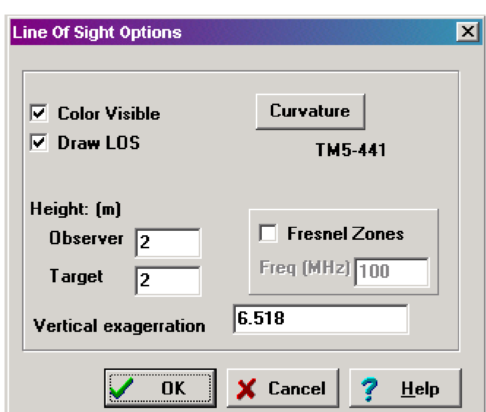
With your elevation file open, click on the <Line of Sight> button→ 

You may identify the endpoints for your LOS on the elevation display or on an associated image or map for the same area. Double click on the start point or observer and then double click on the end point or target. You'll note that a reverse video line is drawn between the start point and the current position of you mouse pointer. While moving the LOS to the target, the marginal data will tell you whether your target is <u>masked</u> or <u>visible</u>. Once you've selected your end point a graph will be displayed showing a cross section of the area. The observer's position is always on the left and the target position is always on the right. The coordinates of these positions are displayed in the current coordinate display format. Green is terrain visible from the observer position, while red is terrain not visible from the observer's position. Vertical and horizontal scales are created for the vertical/elevation and the horizontal/distance axes.



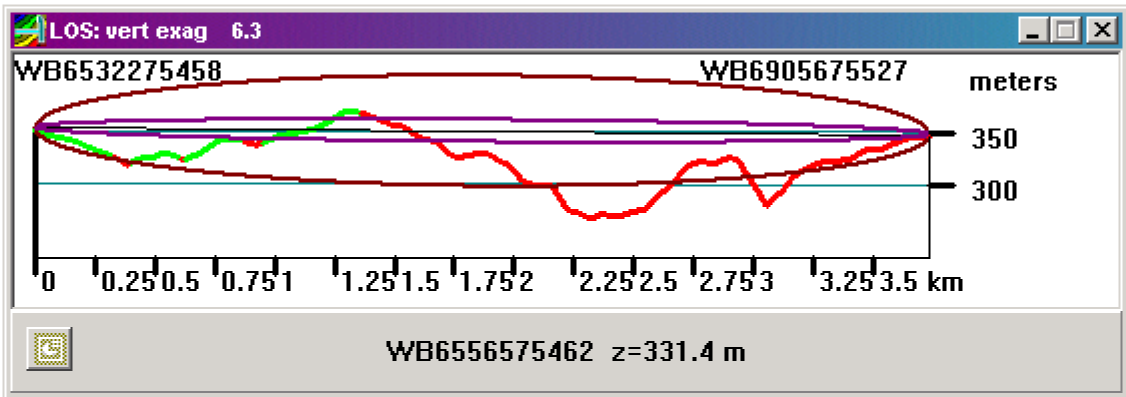
You may resize/rescale the graph by simply clicking on the border of the graph and dragging it to resize as you would any window. **NOTE:** If you move your mouse pointer along the LOS profile, you will get a grid coordinate and elevation reading for that point.

Right mouse click on the face of the graph to bring up the <u>Line of Sight Options</u> window.



Here you can alter the default elevation height for the observer and target by changing the values in the Height: (m) Observer and Target data entry fields.

Checking the Fresnel Zones box will allow you to create a Radio Line of Sight or RLOS at the frequency specified in the Freq(Mhz) data entry field. Once you made the specified changes simply click on the <OK> button to generate the new RLOS graph.



MicroDEM 's Help file contains the following information about RLOS options.

Computation of Fresnel zones for radio line of sight requires two parameters:

- **frequency** in Mhz. This affects the size of the Fresnel zones.
- **k factor**, or effective earth radius multiple. A standard radio atmosphere (standard refraction) has a k factor of 1.333; this value can be used for gross planning of radiolink systems. The value of k will vary with altitude, time of day, the season, weather conditions, latitude, and proximity to the coast. Values for various conditions have been tabulated; often the tabulations give delta N, the mean refractivity gradient in the first km of the atmosphere. If k > 1, the wave refracts toward the earth; if k < 1, the wave refracts upward toward space. Worst case k values will be about 0.4; k=1.33 represents the ideal case. K affects the amount of curvature on the profile.

Interpretation of the Fresnel zones:

- Radio line of sight requires no intrusions into the first Fresnel zone within the first and last1 km next to the receiving and transmitting antennas.
- Want no intrusions more than 40% into the first Fresnel zone at any point. (optimal clearance requires 60% of the first Fresnel zone).
- At least grazing line of sight must exist during adverse refraction (when k =1 or k= 0.667).

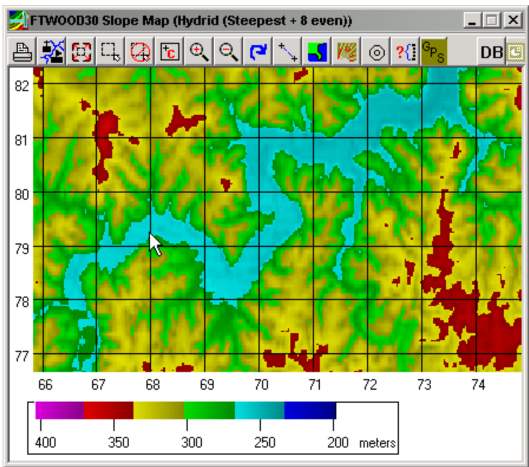
The Fresnel ellipsoid is defined as the loci of all points for which of the sum of the distances from the two antennas is greater by half a wavelength than the direct distance.

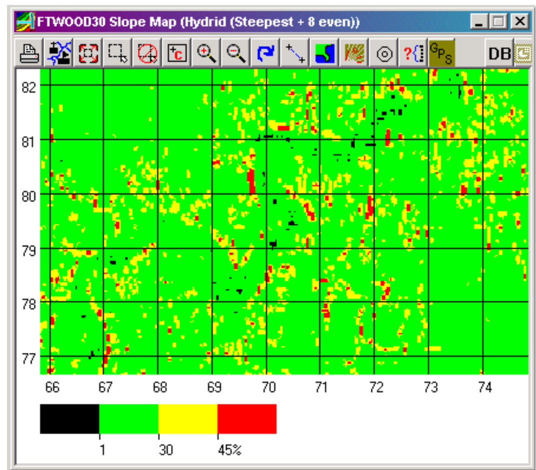
The first Fresnel zone is shown in maroon on the profile. The inner 20% of the first Fresnel zone is shown in purple, and must be free from all obstructions.

Slope Maps

Slope maps are covered completely in **Chapter 2** Basic Raster Operations pages 16 - 17. This tool is helpful for the development of MCOO & CCM overlays, selection of base-camp sites and LZ/DZ'S. Parts of this information are provided in **Chapter 2** on Modifying Display Parameter of Elevation Data.

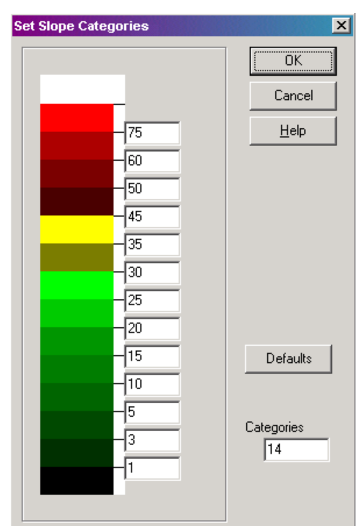
Mobility analysis plots are called slope plots. Artillery analysis plots are referred to as cant plots.





Elevation data, displayed on the left as an Elevation Tint, is redisplayed on the right as a Slope/Cant Plot. The Slope/Cant display's legend represents the four slope categories, <1%, 1-30%, 30-45% and >45% of the NATO mobility model. This is often called a Trafficability plot and is used in assessing cross-country mobility.

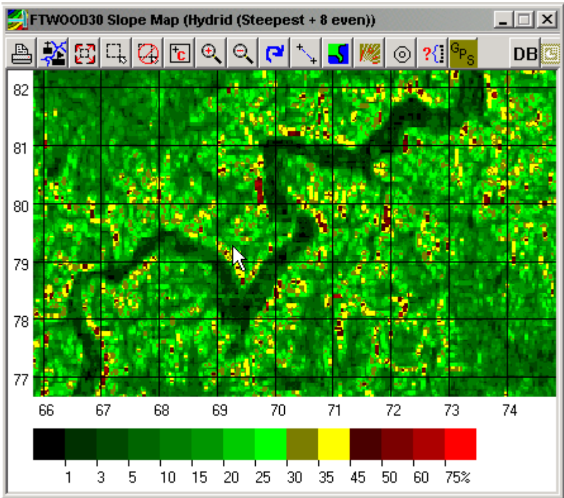
Right click on the display and select Standard from the five available slope plot options on the pop-up menu. This will allow you to customize your slope plot by setting slope ranges and colors for fourteen different categories.



The Set Slope Categories pop-up window will allow you to edit the number of categories, the range for each category and the associated color. Accept the given display for now and click the <OK> button. The display is now broken down into more categories and the new legend can be found at the bottom of the window.

Once you have redefined your slope categories click on the <OK> button to redisplay your data.

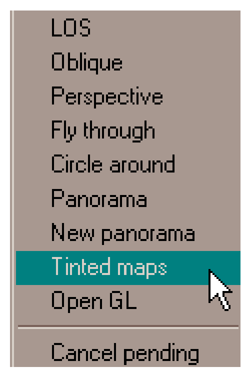
The following map shows the same elevation data from page 63 redefined using the default Standard slope plot. Notice the expanded range of the slope categories in the legend.



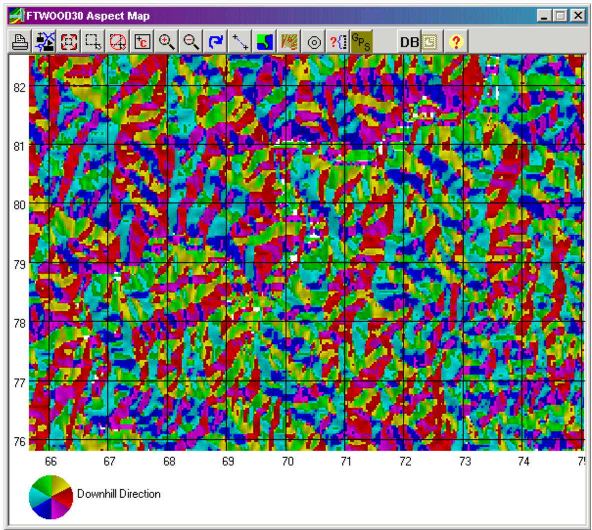
Aspect Tinted Maps

The ASPECT map is another useful display of elevation data. This plot is broken down into six colors showing the direction of slope, which can aid you in determining IV lines (intervisibility lines).

At the main menu select VIEW / TINTED MAPS. This will bring up the Tinted Maps pop-up menu →



Select Aspect from the list. This will generate a new display of your elevation data. The following map shows the same elevation data from page 63 plotted as an aspect map.

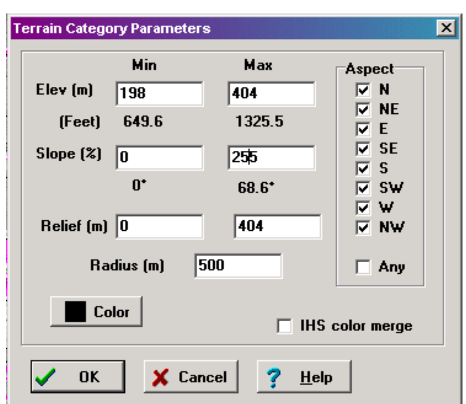


The legend at the bottom of the display shows a compass rose broken into 45 degree segments with the slope direction indicated by color.

Terrain Categories

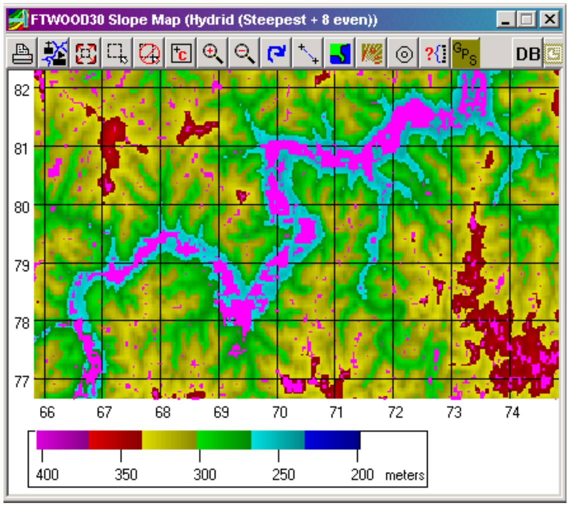
This tool is useful to highlight specific types of terrain based on relief, such as base camp sites, LZ/DZ'S, artillery cant, POL/water sites, etc...

At the main menu select OVERLAY / TERRAIN CATEGORIES. This will bring up the Terrain Category Parameters window.

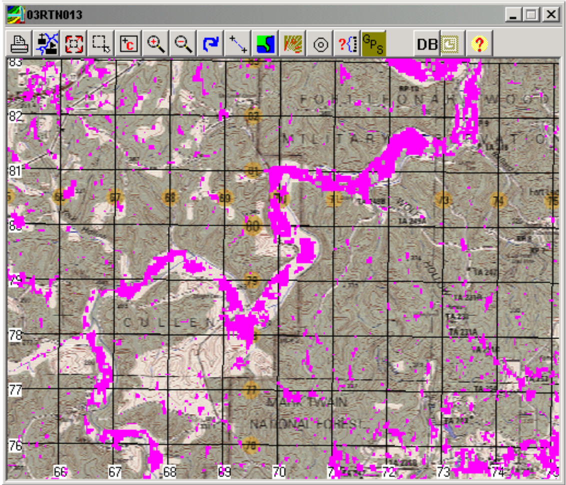


Here you can define the parameters of your mask overlay based on elevation, slope, relief, aspect and radius. The range for each factor will include the full range for your data set so all you need to do is to narrow one or more of the parameters to define your mask.

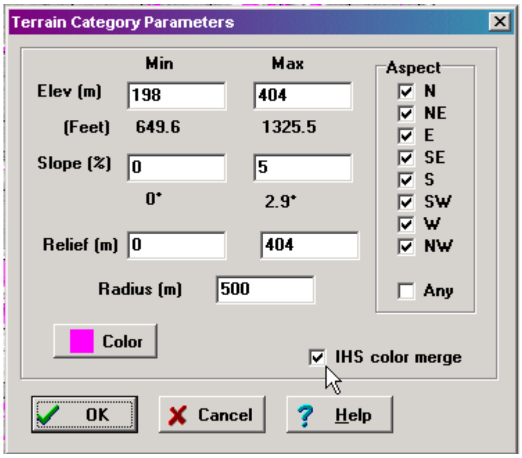
For example, if we were looking for possible base camp sites throughout the entire elevation map, we would define those characteristics desirable for base camps**:** a slope of 0-5% and minimum radius of 300 meters.



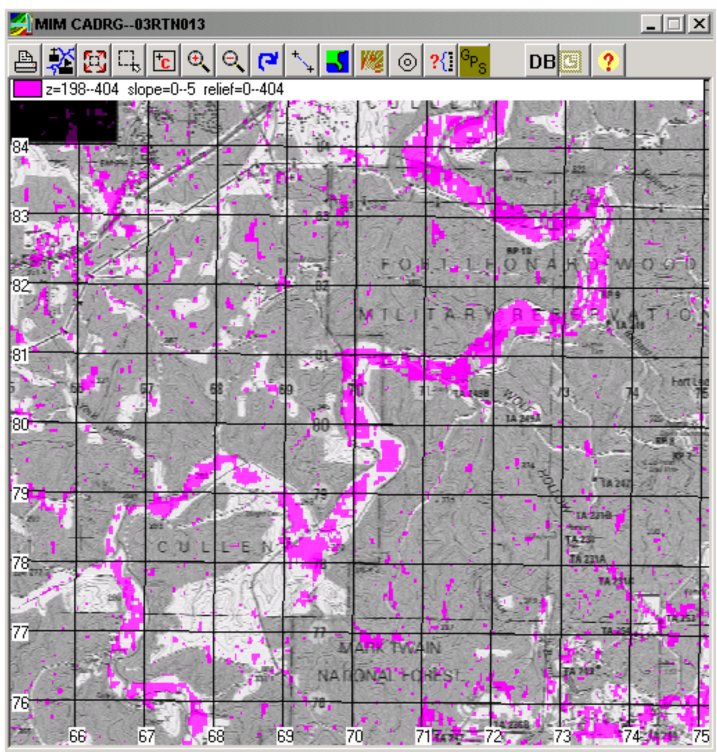
The purple mask overlay highlights those areas meeting our requirements. Remember that you must have your elevation data displayed in order to perform this analysis; however, as with any other analysis, you can actually plot the terrain category mask over any imagery or map of the same area as below.



Transparent IHS Terrain Category overlays may be generated by checking the IHS box [] in the <u>Terrain Category Parameters</u> windows.



The map background is gray-scaled and a transparent mask is applied.

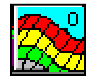


The IHS Terrain Categories Overlay allows you to view text and features behind the mask.

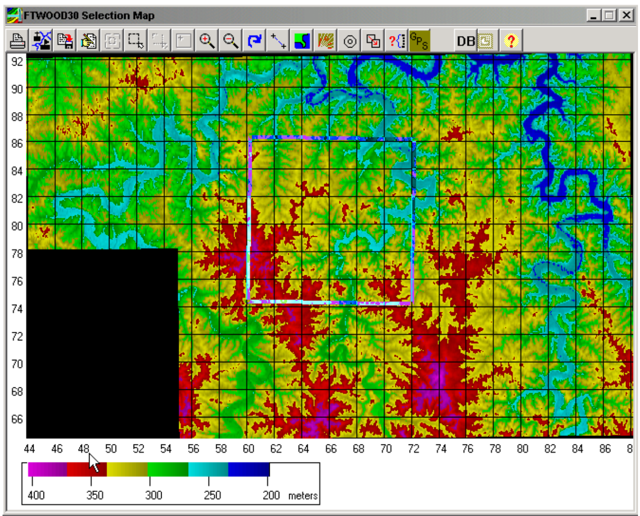
Terrain Category Overlays may be removed by selecting OVERLAY and OVERLAY MANAGEMENT at the main menu.

Oblique Views

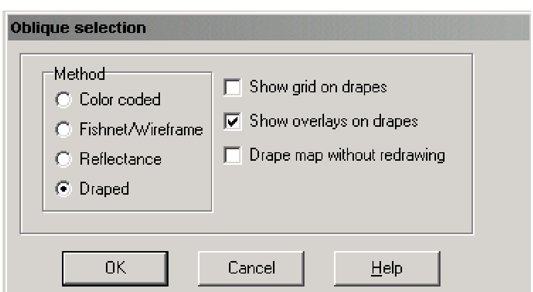
This tool aids in viewing battle positions, avenues of approach, mobility corridors, engagement areas, etc...

With your elevation data open, click on the <Oblique View> button → 

Double click on the left front corner of the area for the oblique then move the mouse pointer to the right front corner and double click Notice that a reverse-video box is drawn which defines the area of your selected oblique view.

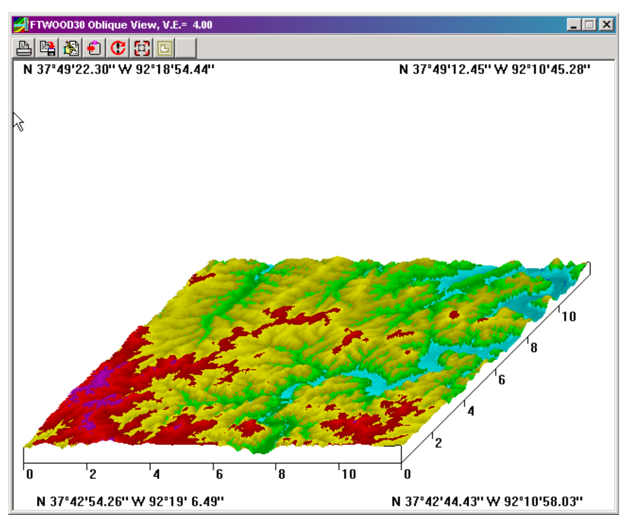


Once you have identified the area for your oblique view the Oblique selection window will appear.

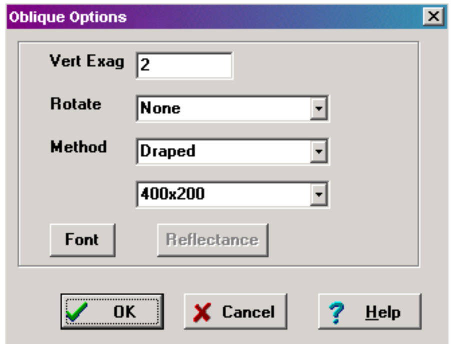


Here you will select the type of oblique view you need. Select Draped and click the <OK> button.

Overlays such as: weapons fans, UTM grids and symbology may be draped by checking the Show overlays on drapes box.

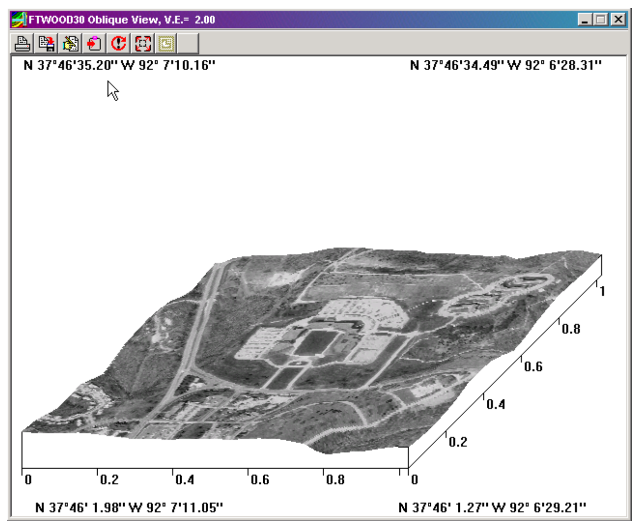


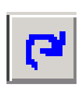
To modify the oblique view right click anywhere in the oblique display. This will bring up the Oblique Options window.



Here you can change the vertical exaggeration, rotate the view in 90 degree increments, change the type of oblique view and change the size of the view. Click on the <OK> button and the view will be redrawn.

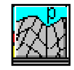
To create the oblique view with imagery or map files draped on top simply have both your elevation data and your image or map open. Identify the front corners of your oblique view by double clicking on the image or map display.

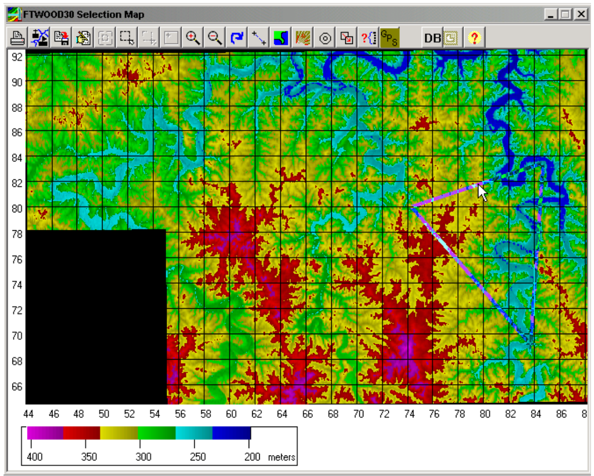


NOTE: To clean the reverse-video area selection box created on your map display simply click on the <FORCE REDRAW> button → 

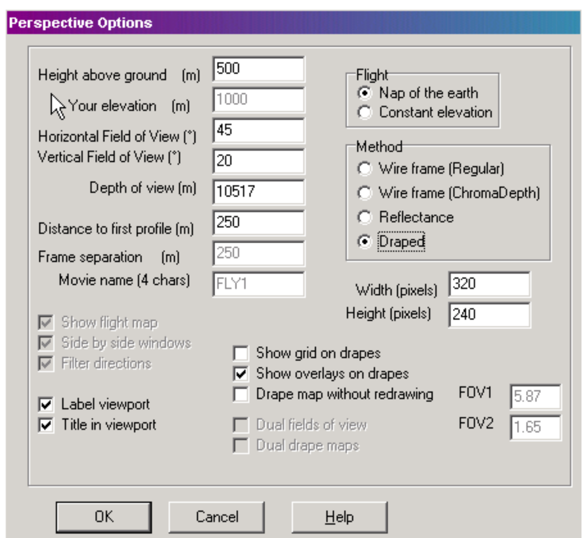
Perspective Views

This tool can provide a view from the foxhole, battle position, helicopter, avenue of approach, and can aid in terrain association.

With your elevation data open click on the <PERSPECTIVE VIEW> button→ 



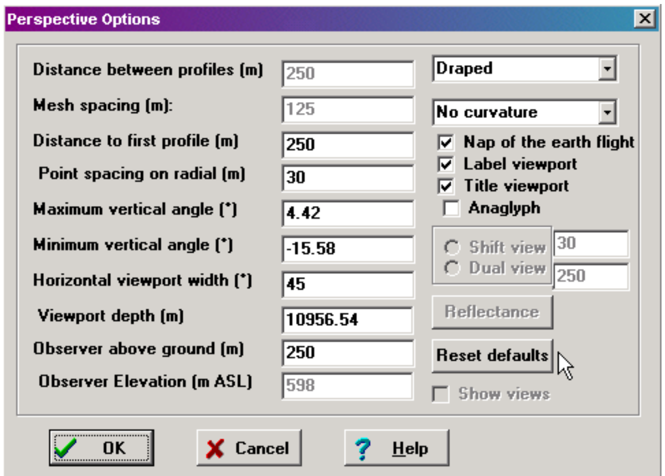
Select the observer's position for your perspective view by double clicking on display with the mouse. As you move your mouse to the end of your field of view you will notice a reverse-video triangle which delineates the area visible in your perspective view. Double click on the end of your field of view to bring up the Perspective Options window.



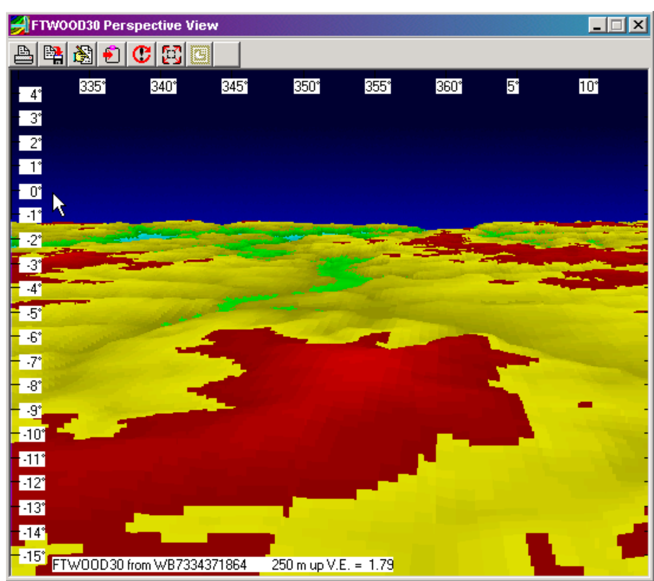
Here you should enter the observer's height above the ground or the observer's elevation above sea level. Selecting Nap of the earth will use the observer's height above the ground. Selecting Constant elevation will use the observer's elevation above sea level. Normally you would select Draped under the Method section. The Width (pixels) and Height (pixels) data entry fields will determine the original size of the perspective view. Don't worry about any of the other settings for now. You can experiment with other settings at your leisure.

NOTE: The Perspective View may be enlarged or reduced in size by simply clicking on the border of the display and dragging to resize the display as you would any other window.

If the perspective view doesn't look right you can right click on the display to bring up the second Perspective Options window.



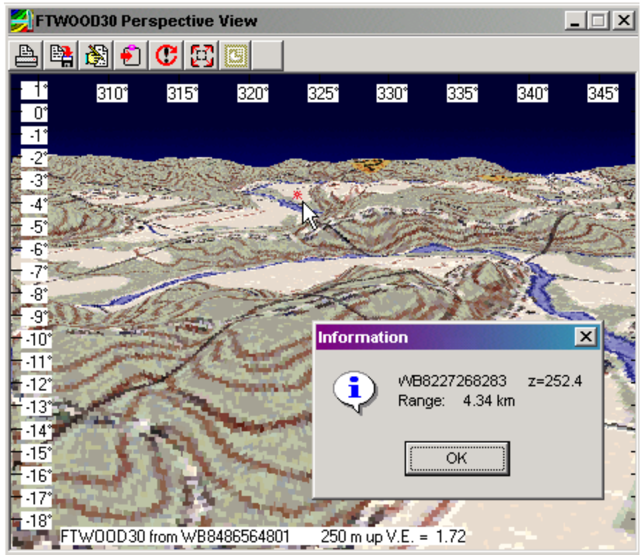
Here you can change a variety of parameters for the view but the most common adjustment will be the <u>Maximum vertical angle (*)</u> and the <u>Minimum vertical angle (*)</u>. These two data entry fields represent the position of the top of your perspective view display and the bottom of the perspective view display and correspond with the vertical scale running up the left side of the display which is marked in degrees from the horizontal.



Note the position of the mouse pointer at ZERO or horizontal. Also note that the compass bearing is listed across the top of the perspective view. The data set you're using is listed at the bottom of the display along with the observer's position, observer's elevation and the vertical exaggeration of the view.

Vertical exaggeration is controlled by the difference in the Maximum vertical angle and the Minimum vertical angle. The down-look angle will need to be adjusted, by dropping both of these values, if you have your observer at any great height.

One interesting feature of the perspective view is the ability to double click on any given target position in the view and get a report on the coordinate for the target, the target's elevation and the target's distance from the observer.

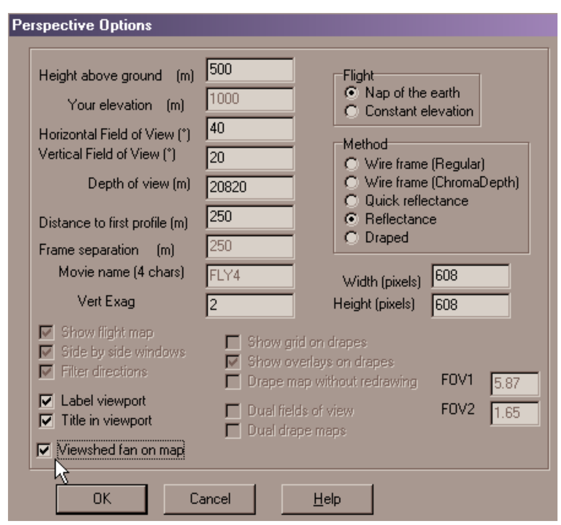


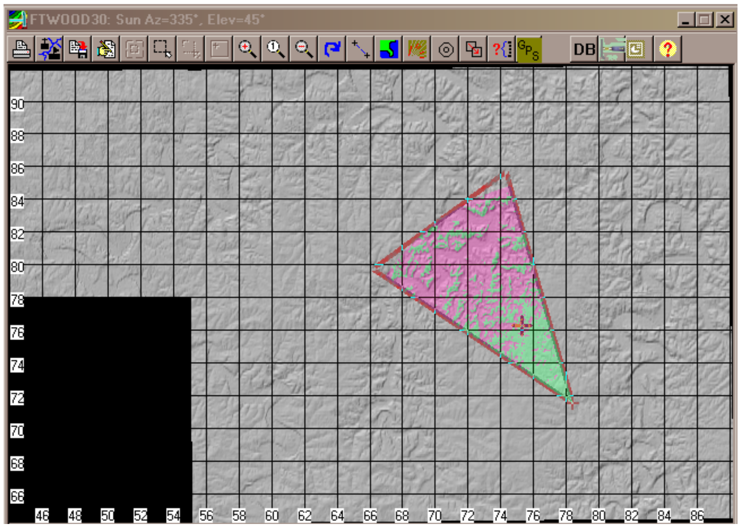
To create the perspective view with imagery or map files draped on top simply have both your elevation data and your image or map open. Identify the observer's position and the end point of your field of view by double clicking on the image or map display.

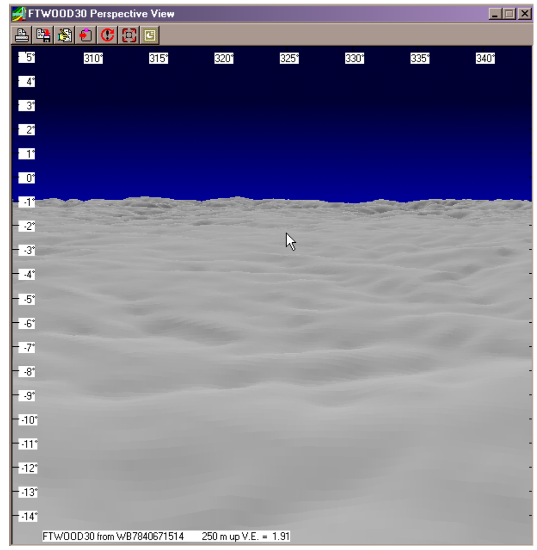
Live Map Coordinate Display and View Shed 2D Overlay

Perspective Views will now display coordinates real-time for the mouse pointer over the perspective view. The current position of the mouse pointer in the perspective view is also shown in the 2D map view. See the figures at the top of page 108.

Another new feature is available for selection in the lower left corner of the Perspective Options dialog. The Viewshed Fan on Map checkbox will generate an I.H.S. transparent viewshed inside the view field of the perspective view on the 2D map display. See the left figure top of page 108.





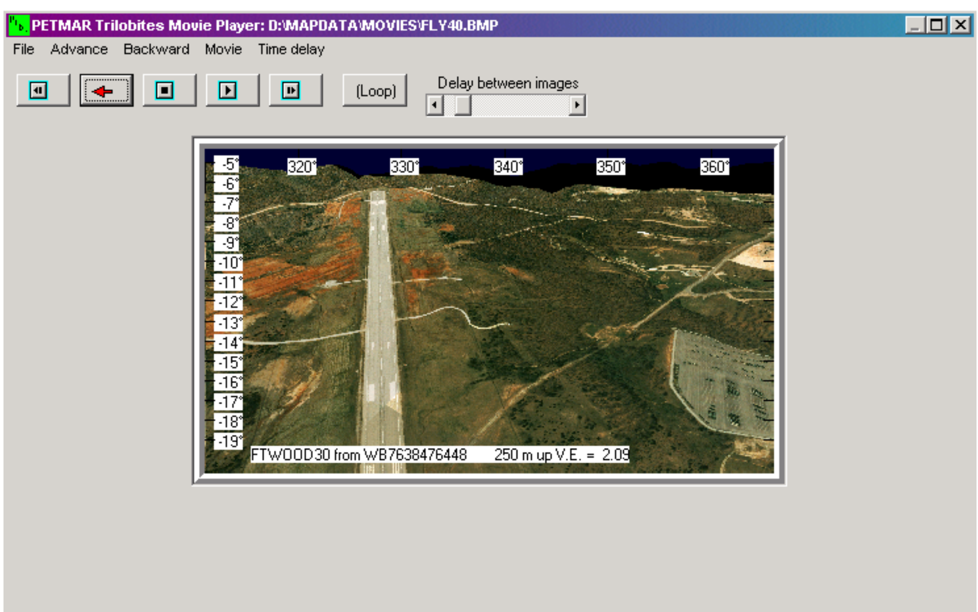


2D reflectance map view of Fort Leonard Wood DEM showing masked (purple) and visible areas (green).

Perspective View of FLW DEM with live readout of mouse pointer coordinates.

Fly Through Movies

This tool allows you to drive down avenues of approach or fly along a particular route to gain a better understanding of the surrounding terrain. Fly through movies may be created over elevation-data, imagery or maps but you must always have the elevation data loaded for the area. To create the fly through with imagery or map files draped on top simply have both your elevation data and your image or map open. Identify the observer's position and the end point of your field of view by double clicking on the image or map display instead of over the elevation data display.



This tool uses techniques similar to those outlined in the previous section on the Perspective View. Each movie is actually made up of several files: an .FLT file which defines the route, a .MOV file which is an ASCII list of the frame files making up the movie and the individual .BMP, GeoTiff or .JPG frame files which are numbered sequentially.

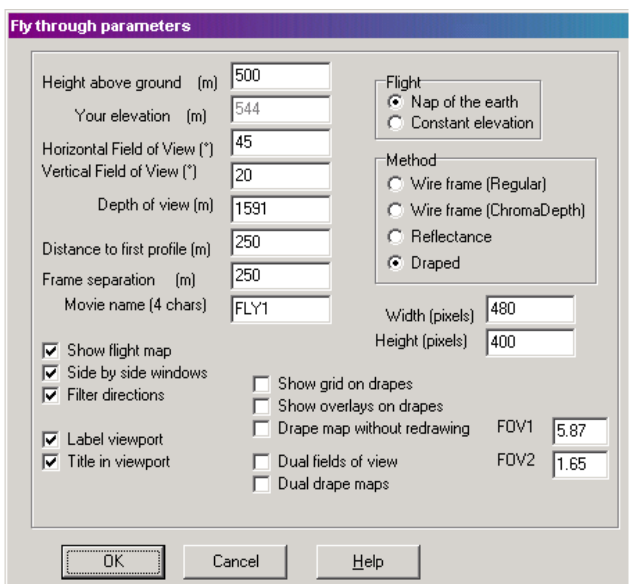
Once created, the movie may be replayed using MicroDEM's built in PETMAR Trilobite movie player (shown above), or it may be converted to other standard formats such as a Microsoft Audio-Video Interleave (.AVI), an Animated Gif (.GIF) or an Mpeg (.MPG) movie. These alternate file formats may be utilized with other software such as the Microsoft Multimedia Player and Power Point.

Click on the <FLYTHROUGH> button → 

Double click on the display to identify the starting point for the route for the fly through. Move your mouse pointer to the next point along the route and double click again. Continue this procedure until you reach the end of your planned flight route then right mouse click to bring up the small End selection menu.

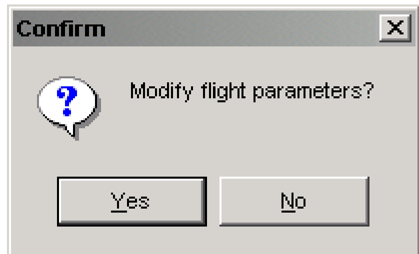
Left click on the End selection menu → 

This will bring up the Fly through parameters window.

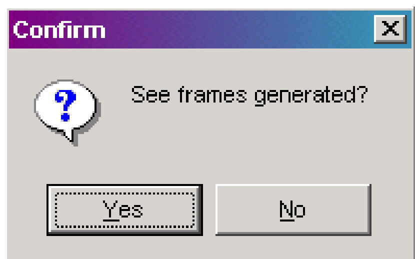


Here you should enter the observer's height above the ground or the observer's elevation above sea level. Selecting Nap of the earth will use the observer's height above the ground and will produce a terrain-following fly through. Selecting Constant elevation will use the observer's elevation above sea level and will produce a level-flight fly through. The default setting for Distance between profiles is 250 meters, shorter separation will make your movie run smoother but will significantly increase its storage size. Normally you would select Draped under the Method section, this will lay your image or map over the elevation data. The Width (pixels) and Height (pixels) data entry fields will determine the original size of the perspective view. Movies are given a default 4 character name starting with FLY1 and incremented thereafter to FLY2, FLY3 etc. Type a new four character name in the Movie name (4 chars) data entry field if you want a more descriptive movie name. **BE WARNED:** Movies take up huge amounts of hard drive space. You should copy any movies you wish to keep to back-up media and remove them from your hard drive. Delete all unneeded movies as soon as possible. Selecting JPEG for the movie format will also conserve disk space.

Don’t worry about any of the other settings for now. You can experiment with other settings at your leisure. Click on the <OK> button to begin generation of the individual frames for the movie. Remember that if you have identified a long route, are using high-resolution imagery or have a slow computer, generation of all your frames will take some time. Each frame of the movie will be displayed as it is generated. To change any of the parameters during movie generation simply click on the <Abort processing > button on the Drawing Perspective n/n pop-up window. This will bring up the Confirm Modify Flight Parameters pop-up window. To modify flight parameters click the <YES> button. To see the movie as generated up to this point click on <NO> →

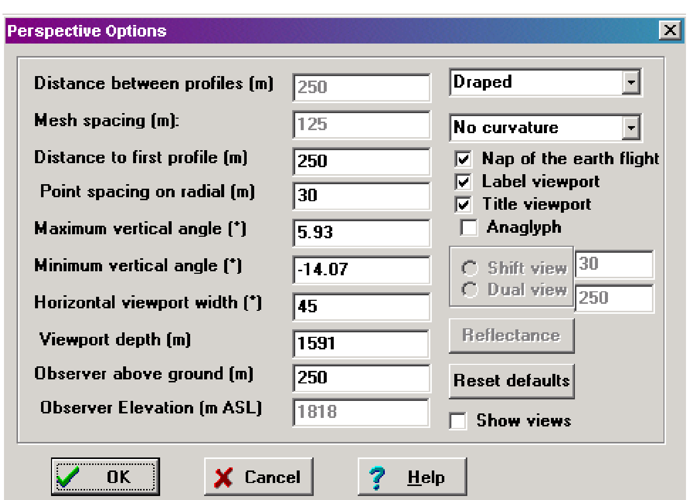


Clicking <NO> will bring up the Confirm – See frames generated window.



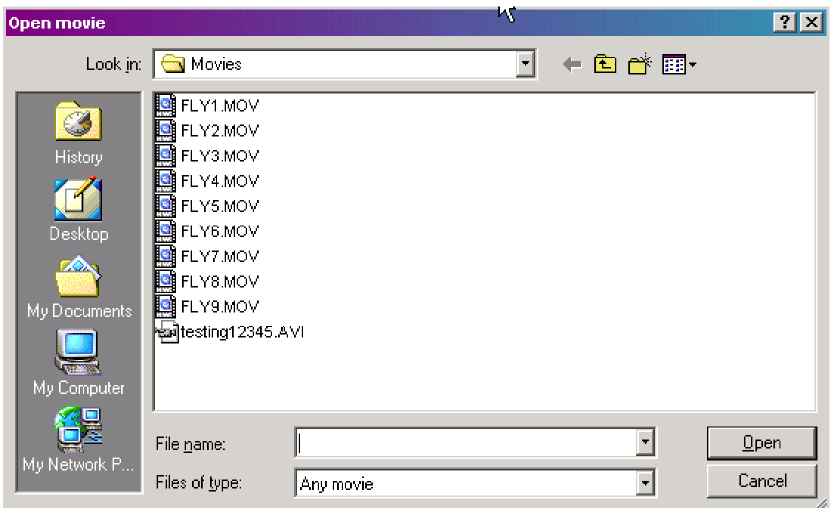
Click on the <YES> button to display the movie up to the point that you interrupted its generation. Click on the <NO> button to terminate the entire movie creation process.

Clicking <YES> on the Modify flight parameters window will bring up the Perspective Options window.



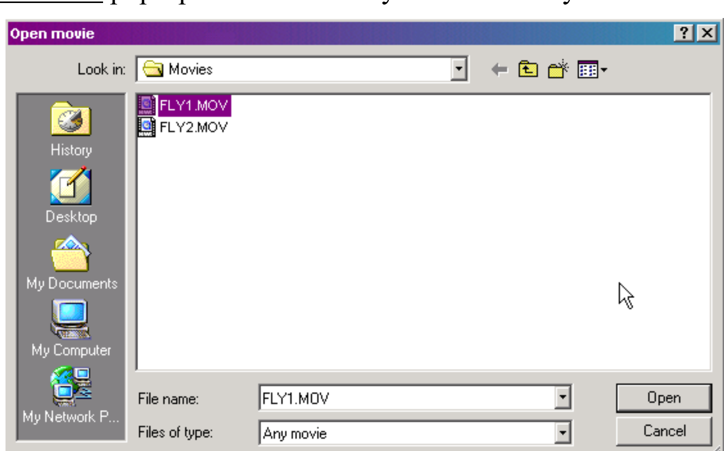
Here you can change a variety of parameters for the view. Again, the most common adjustment will be the Maximum vertical angle (*) and the Minimum vertical angle (*). These two data entry fields represent the position of the top of your perspective view display and the bottom of the perspective view display and correspond with the vertical scale running up the left side of the display marked in degrees from the horizontal.

Again, click on the <OK> button to begin generating the movie from scratch. This will bring up a Drawing Perspective n/n progress bar showing the progress of movie frame generation. When the movie creation process has completed the Open movie window will appear.



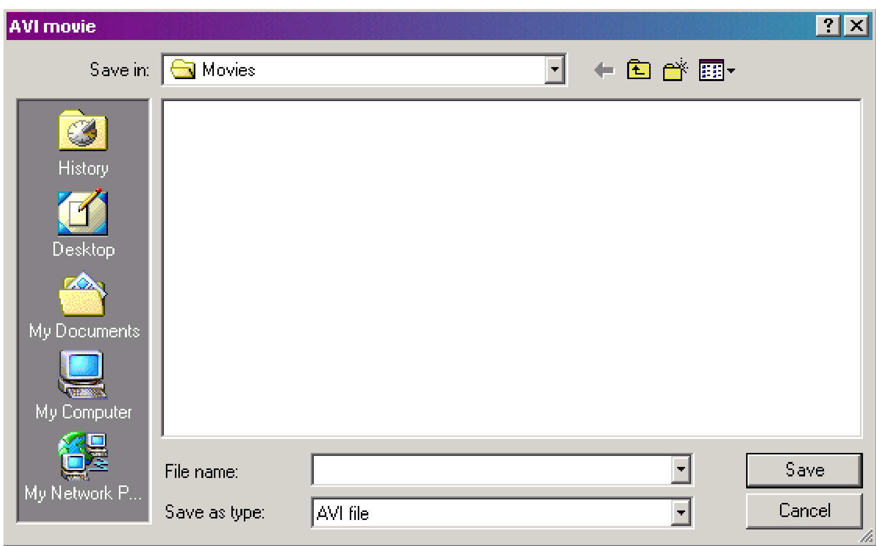
Here you may select the movie you just created or you may display any of the previous movies you created. The movie will be displayed in MicroDEM's built in PETMAR Trilobite movie player.

To convert your MicroDEM movie into another, industry standard, movie format select FILE/TOOLS/MOVIE REPLAY to bring up the PETMAR Trilobite movie player.
You will first get the Open movie pop-up window where you will identify which movie you wish to play.



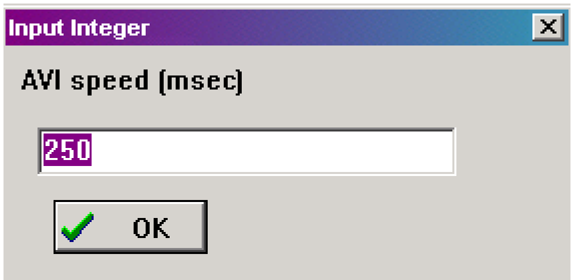
Next or if you are already running a movie in the PETMAR Trilobite movie player.
At the PETMAR Trilobites Movie Player main menu select FILE/CONVERT TO AVI.

This will bring up the AVI movie name pop-up window.



Enter the name you wish to give your AVI movie.

This will bring up the Input Integer – AVI speed (msec) pop up window.



This is the default time delay between each frame in your movie in milliseconds. You can experiment with this value but for now simply click on the <OK> button to accept the default value.

The MicroDEM **HELP** file lists the following information on Movie Conversion**:**
There are three options for exporting a movie. The recommended solution is to use the animated GIF option. It produces compression and the most universal success.

1. **File, Convert to AVI:**
A title sequence will be added to the start of the movie.
All images will be stretched to that of the first image
The AVI will have no compression.

2. **File, Convert to MPEG:** this will convert the movie to AVI format and then convert the AVI to MPEG. The MPEG conversion uses the freeware command line program avi2mpg1 version 1.5 (1997) by John Schlichther. This file must be in the utils subdirectory on the hard disk, as a subdirectory of the directory from which you are running the program. The MPEG will have an M1V extension, and may not be universally compatible with all viewers. This conversion sometimes fails for unknown reasons.

3. **File, Convert to GIF**: this will be compressed a reasonable degree. It will work in web browers (both IE and Netscape), but some graphics programs will not display the animation but only the first frame.

4. **File, Export**: You can export the MOVIE into a format for conversion to MPEG or AVI standards, which will do the following:
Give you the option of putting the file name in the upper left corner of the screen, for instance to keep the date with the image if the files are named that way.
Convert all images in the sequence to the size of the first one. The converters I have seen do not accept different sized images. This will be done by stretching or shrinking.
Name the files in sequential order for automatic import in the outside converter.
Allow inserting each BMP multiple times to slow down the movie.
This copies all the BMPs, and requires appropriate disk space.
Some animations, such as the fly throughs produced by MICRODEM/Terra Base II, should already be in the correct format and should not require this export step.

NOTE: Try to remember the file name of each fly through you create and delete any fly through files you do not need to avoid eating up precious hard drive space.

Movies may be deleted using the Windows Explorer by navigating to the ..\Mapdata\Movies directory and deleting the .flt, .mov, and .bmp/.jpg files with your 4 character file name prefix. Movies may also be deleted by selecting FILE/DELETE MOVIE option in the Movie player, or by selecting FILE/DATA MANIPULATION/DELETE/MOVIE option from the MicroDEM main menu.

Remember: Creating fly through movies is an art, not a science. Have patience, get the hang of how the movies are created and how different data types are displayed. Be creative and have fun, your efforts will be rewarded.

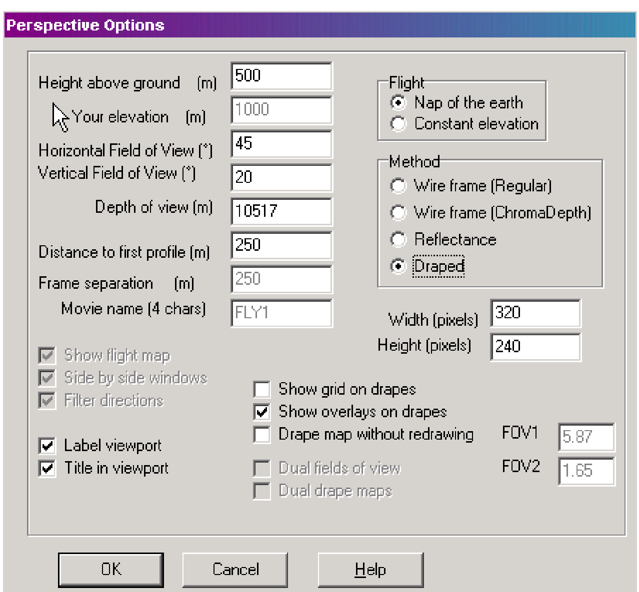
Panoramic View Movies

This tool allows you to generate a movie that shows the view as you stand at one location and spin clockwise or counter clockwise up to 360 degrees at any desired increment. This can be especially helpful in examining battle/LP-OP/surveillance positions and for terrain association. The tool will create a series of movie files similar to that of the fly through.

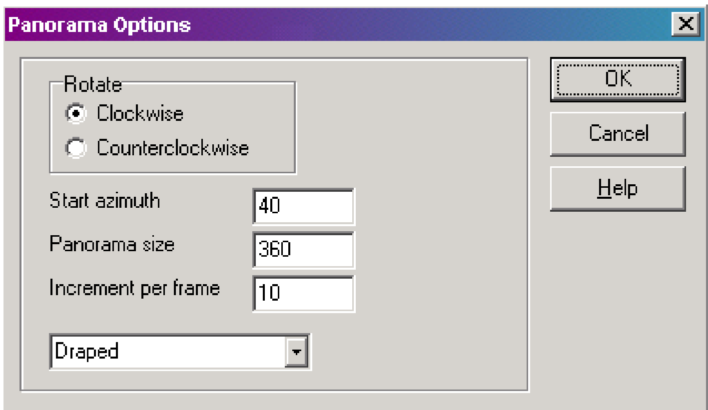
Panoramic movies may be created over elevation-data, imagery or maps but you must always have the elevation data loaded for the area. To create the movie with imagery or map files draped on top simply have both your elevation data and your image or map open. Identify the observer's position and the end point of your field of view by double clicking on the image or map display instead of over the elevation data display.

At the MicroDEM main menu select VIEW / PANORAMA. Double click on the center point for the Panoramic view. Move your mouse point to any point along the radius of your planned view-circle and double again. Notice as you move your mouse pointer you will drag the perspective triangle out to indicate the initial direction and distance of view you desire

This will bring up the Panorama Options window.

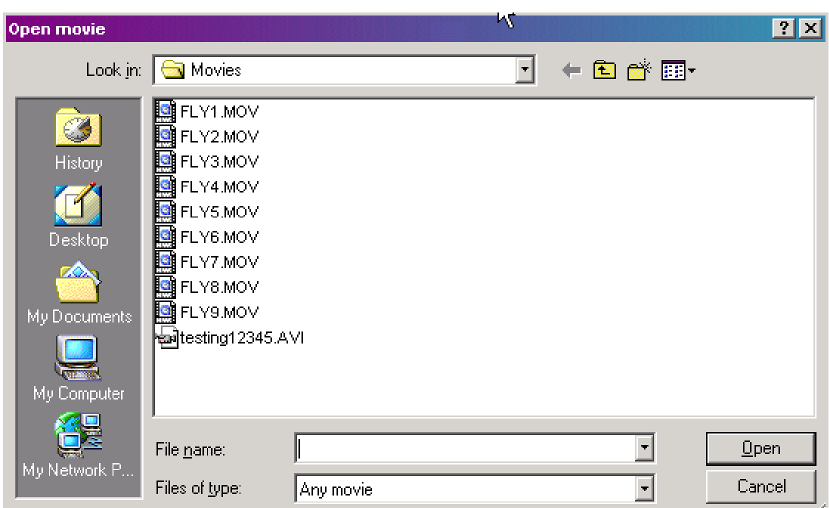


Here you can enter the observer's height above the ground or the observer's elevation above sea level. Selecting Nap of the earth will use the observer's height above the ground and will produce a terrain-following panoramic view. Selecting Constant elevation will use the observer's elevation above sea level and will produce a level-flight panoramic view. Normally you would select Draped under the Method section, this will lay your image or map over the elevation data. The Width (pixels) and Height (pixels) data entry fields will determine the original size of the perspective view. Movies are given a default 4 character name starting with FLY1 and incremented thereafter to FLY2, FLY3 etc. Type a new four character name in the Movie name (4 chars) data entry field if you want a more descriptive movie name. This will bring up the Panorama Options window.



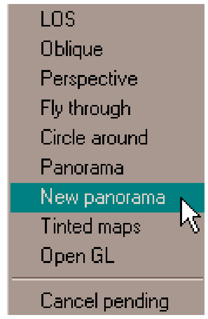
Here you can select the direction of rotation, the start azimuth, the panorama size (default is 360 degree full circle), increment of rotation by degrees, and method of drawing (default is Drape). You may experiment with the setting but for now accept the default values and click on the <OK> button. This will bring up a Drawing Perspective n/n progress bar showing the progress of movie frame generation.

When the movie creation process has completed the Open movie window will appear.



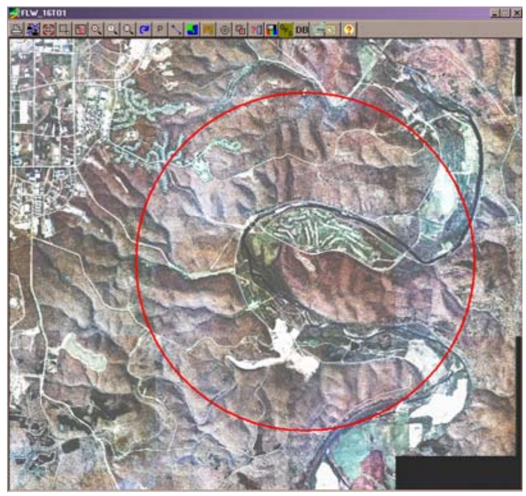
Here you may select the movie you just created or you may display any of the previous movies you created. See the previous section on Panoramic Movies for how to convert and how to delete movie files.

450 Degree Live Panoramic View

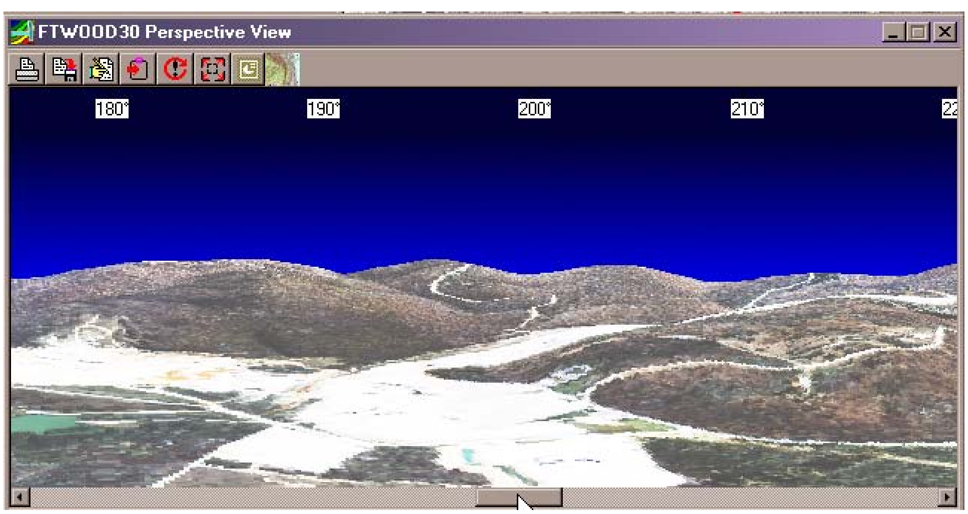


This New Panorama, draws a 450 degree view (you can move up to 45 degrees either side of the north at the start and end), and you use the slider bar to select the view. With your elevation data and image or map loaded select New Panorama from the View drop-down menu →

Double click on the center point for the observer's position and then at the end of the view field. Your 2D map display will show the view radius defined by your selection.



A perspective view window will display a portion of the observer's view. The scroll bar at the bottom of the display allows you to adjust the look direction in real-time.



Like other single frame perspectives when you roam on the perspective view, the status bar at the bottom of the screen will show your location, the range, and the azimuth and pitch to the point where the mouse cursor is located. You can also see your location on the 2D map display, if you have multiple map roam selected on the options form.

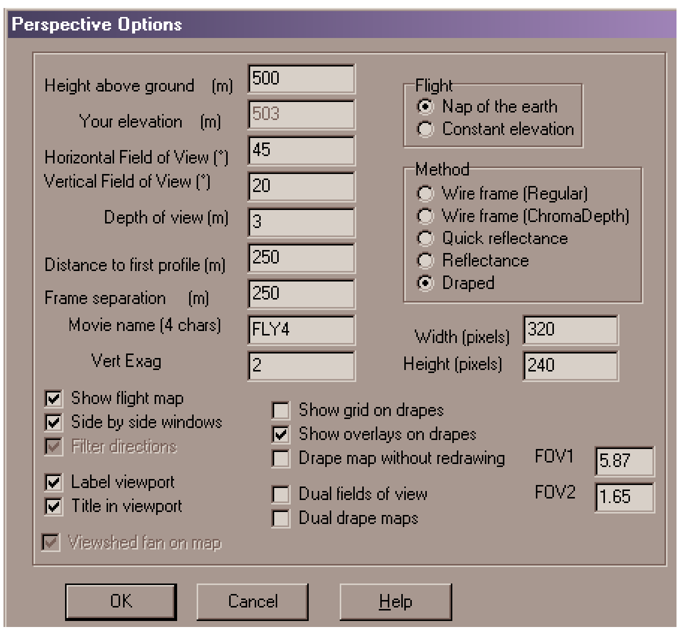
Circle Around Movies

This tool allows you to generate a movie that shows the view as you circle around one location clockwise or counter clockwise, looking inward. This can be especially helpful in examining battle/LP-OP/surveillance positions and for terrain association. The tool will create a series of movie files similar to that of the fly through.

Circle Around movies may be created over elevation-data, imagery or maps but you must always have the elevation data loaded for the area. To create the movie with imagery or map files draped on top simply have both your elevation data and your image or map open. Identify the observer's position, the end point of your field of view and the center point by double clicking on the image or map display instead of over the elevation data display.

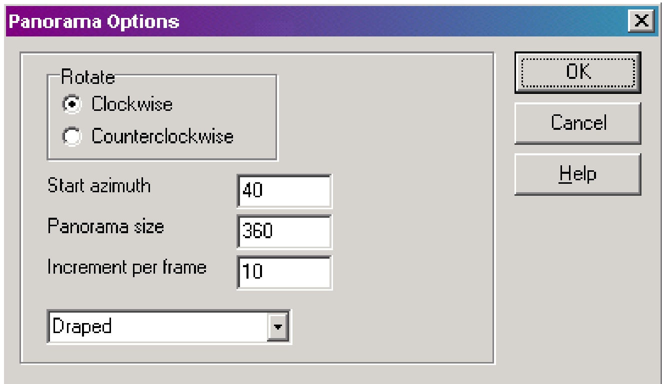
At the MicroDEM main menu select VIEW / CIRCLE AROUND. Double click anywhere on the radius of the circle around your target viewpoint. Move your mouse pointer to the end of the view field and double again. Notice as you move your mouse pointer you will drag the view triangle out to indicate the initial direction and distance of view you desire. Finally double click inside the reverse-video view triangle to identify the point your wish to circle around.

This will bring up the Perspective Options window.



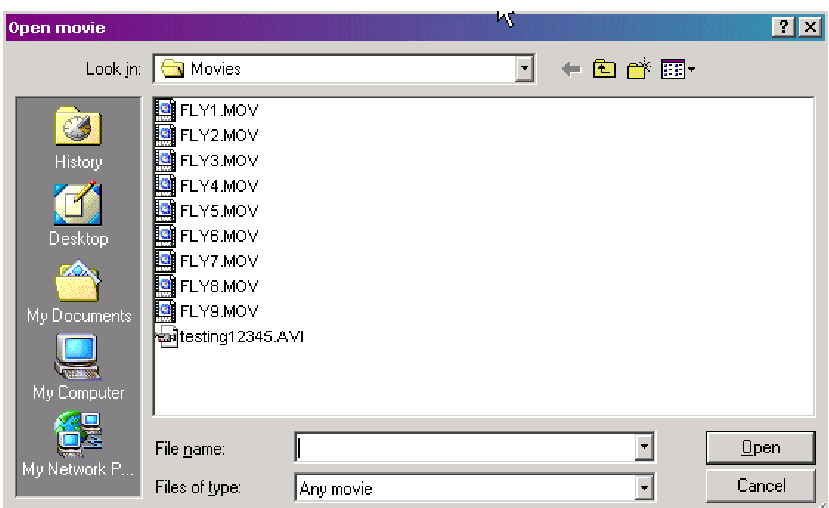
Again, here you can enter the observer's height above the ground or the observer's elevation above sea level. Selecting Nap of the earth will use the observer's height above the ground and will produce a terrain-following panoramic view. Selecting Constant elevation will use the observer's elevation above sea level and will produce a level-flight panoramic view. Normally you would select Draped under the Method section, this will lay your image or map over the elevation data. The Width (pixels) and Height (pixels) data entry fields will determine the original size of the perspective view. Movies are given a default 4 character name starting with FLY1 and incremented thereafter to FLY2, FLY3 etc. Type a new four character name in the

Movie name (4 chars) data entry field if you want a more descriptive movie name. This will bring up the Panorama Options window.



Here you can select the direction of rotation, the start azimuth, the panorama size (default is 360 degree full circle), increment of rotation by degrees, and method of drawing (default is Drape). You may experiment with the setting but for now accept the default values and click on the <OK> button. This will bring up a Drawing Perspective n/n progress bar showing the progress of movie frame generation.

When the movie creation process has completed the Open movie window will appear.



Here you may select the movie you just created or you may display any of the previous movies you created

See the previous section on Panoramic Movies for how to convert and how to delete movie files.

Route Observation 'Ambush' Movies

Route Observation movies show the cumulative visibility and instantaneous visibility along a route allowing you to plan ambush emplacements and to anticipate enemy positions. The final frame in each movie is a color-coded plot showing the percentage of the route visible from positions outside and along the route. Given a fixed vehicle speed this would translate directly to exposure times along the route. This Ambush Cover percentage visibility plot is also produced as a separate map display.

You may create ambush movies over elevation data, imagery or maps but must always load your elevation data as a minimum. Remember that available elevation data is typically very low resolution and does not usually reflect construction cuts or fills.

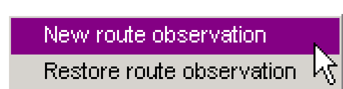
Various options will allow you to adjust the range, observer elevation, target elevation, frame separation along the route, opaque color overlay, transparent I.H.S. overlay, visible area plot, masked area plot or mixed visible plus masked area plot. It is not recommended to produce a mixed visible and masked area route observation movie since the results are confusing and have limited utility.

Individual frames may be saved in .BMP, .JPG or Geotif formats. **NOTE:** When the movie frames are saved as GeoTifs each frame is a georeferenced map and may be used by itself in any standard GIS software as a map background. Once the movie is created you may export to an .AVI, MPEG or animated .GIF format.

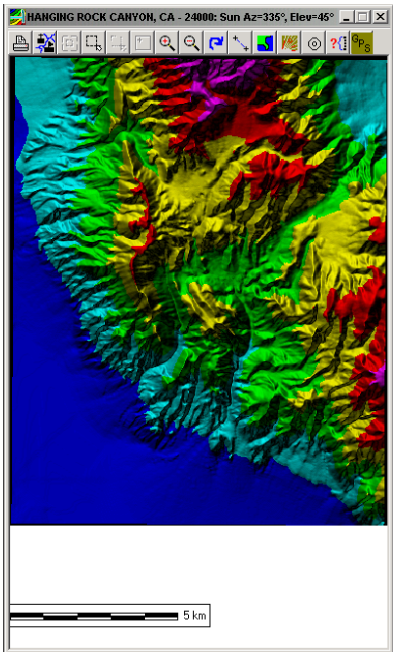
If you have high resolution IFSARE or LIDAR elevation data you can use this tool to plan routes through urban areas.

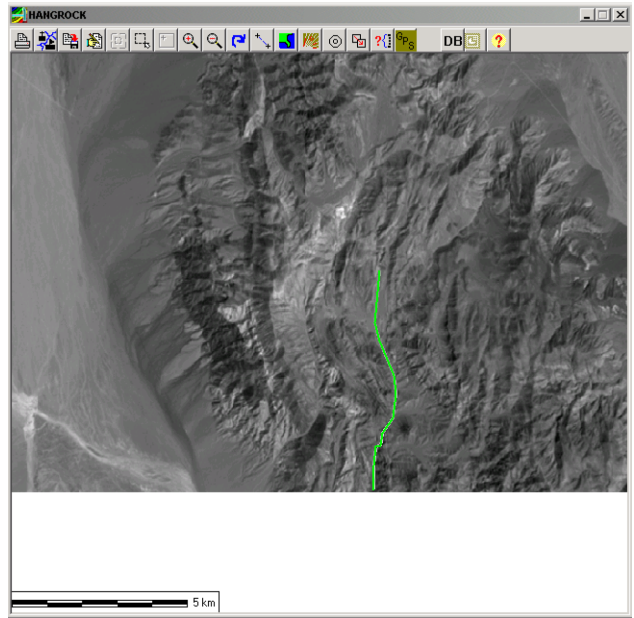
After you have your elevation and map background data displayed go to the main menu and select OVERLAY/ROUTE OBSERVATION to bring up the Route Observation popup menu.

This will bring up the Route Observation popup menu.



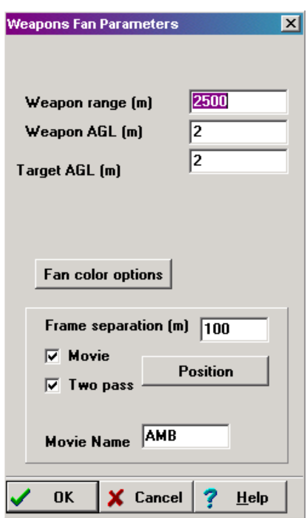
Here you can select New route observation to select the route for a new movie or you can select Restore route observation, pick the desired .FLT file from your ..\Mapdata\Movies directory and use a previously defined route to generate a new movie.





Once you've defined the last segment of your route over your elevation, image or map display right click on the display to bring up the popup menu and click on the single choice to <u>End selection.</u>

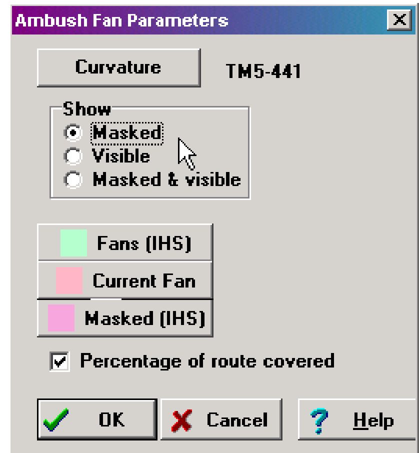
This will bring up the <u>Ambush Fan Parameters</u> window.



Here you may set the weapon range, weapon elevation, target elevation, frame separation along the route, and change the three character name prefix for the movie. You may then click on the

<Fan color options> button →

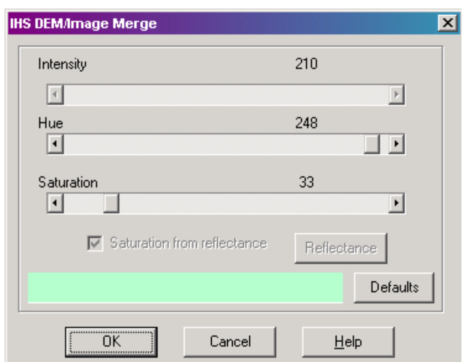
This will bring up the Ambush Fan Parameters window.



Here you can change the type of weapons fan to masked, visible or masked & visible. You may also change the transparent color of the specific type of fan by clicking on the <Fans (IHS)>,

<Current Fan> or <Masked (IHS)> buttons →

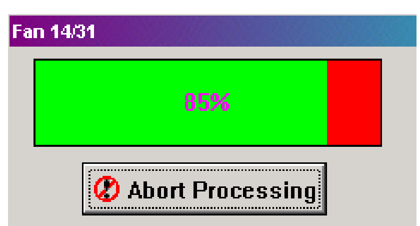
This will bring up the IHS DEM/Image Merge controls where you can adjust the color and transparency of you weapons fans.



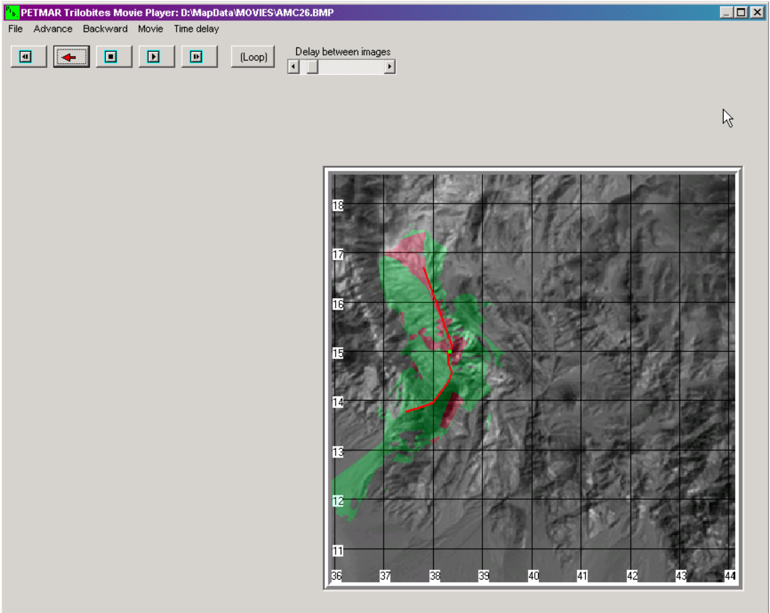
When you have completed your selections close each of the windows by clicking on the <OK>

button →

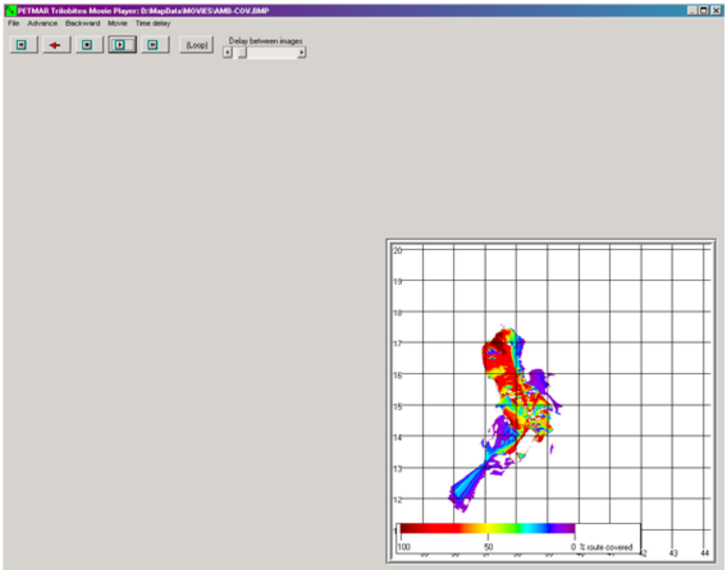
Your movie will be generated frame by frame over your display while a series of movie processing progress bars indicate how many frames will be generated along your selected route and how long it will take to complete.

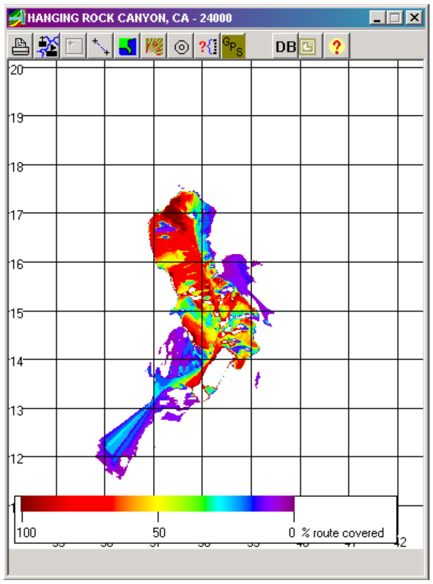


When processing is completed your movie will begin to play in the PETMAR Trilobites Movie Player.



The final frame of the movie will show a plot of Ambush Cover.

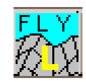


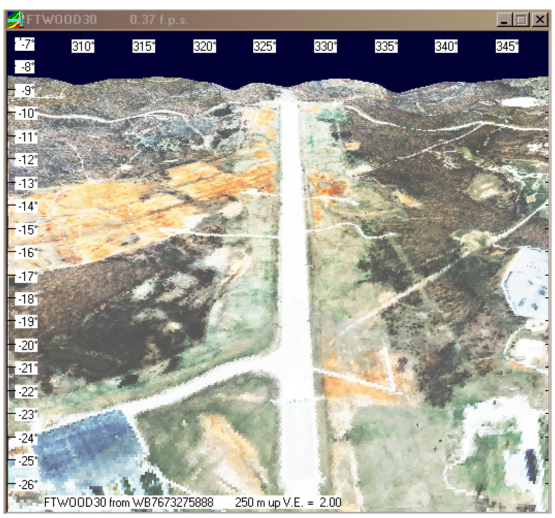


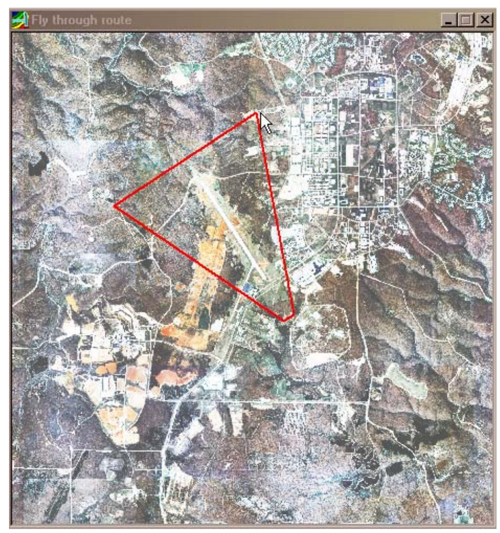
The Ambush Cover is also generated as a standard map display window when you exit the movie player. **NOTE:** The legend shows the color scheme for the percentage of the route covered from any given position along or outside the route.

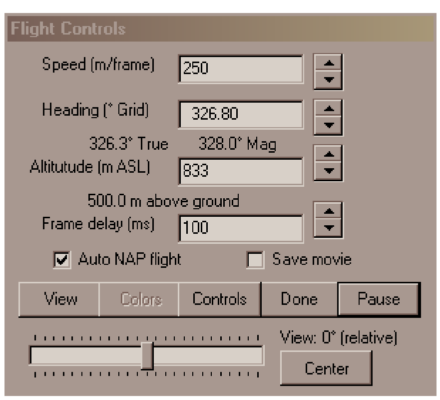
Variable Look Direction and Live Flythrough Movies

This option allows you to fly over your data in near real-time. Frame rates will vary between computers and will be slower when you are capturing to a movie. You can use the joystick for live flying but this isn't necessary since the flythrough may be controlled from the keyboard. **Note** Enable the joystick by selecting OPTION at the main menu. Select the VIEW tab and check the USE JOYSTICK box located in the lower right corner. The joystick must also beset up in windows.

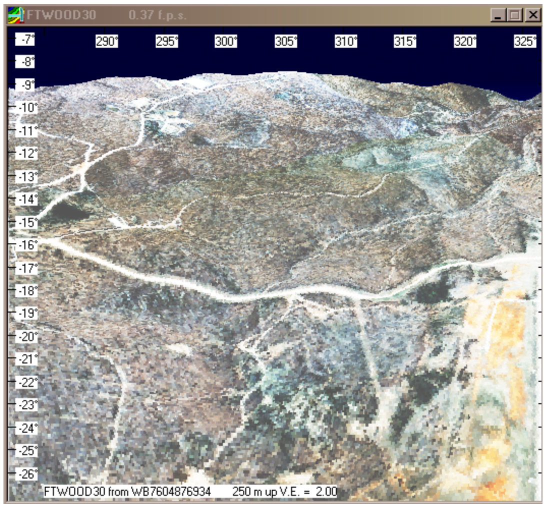
Like all fly throughs you must have elevation data for your area of interest. Fly throughs may be flown over elevation data alone or may be draped with imagery or map data. After displaying your elevation data and, if desired, imagery or map for your AOI you may begin your Live Fly by selecting the < Live Fly > button at the main menu → 

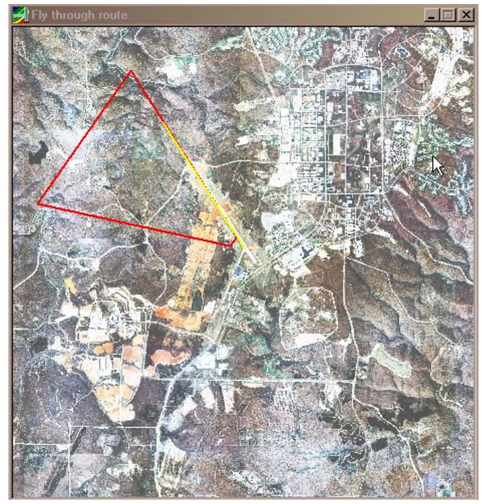






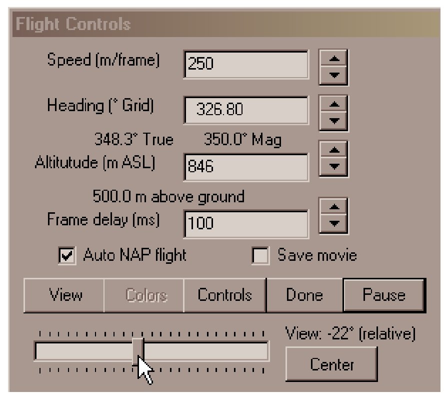
The keyboard control allows you to change your speed, heading and altitude during flight. You may select terrain following flight by checking the Auto NAP Flight box. You may adjust view parameters by clicking the <View> button.

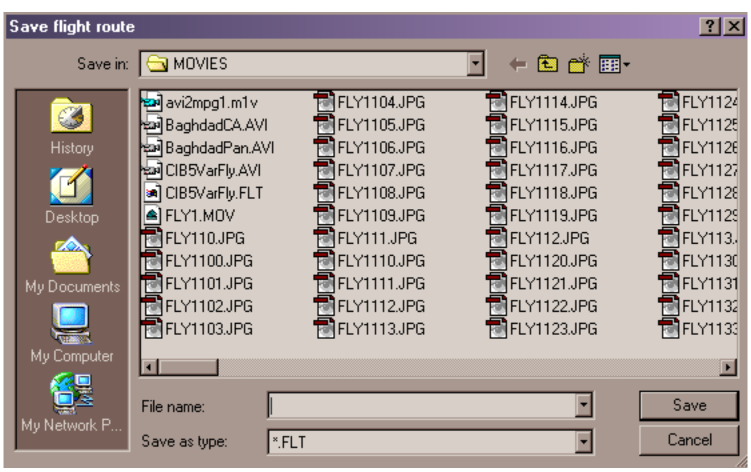




The most significant improvement to the Live Flythrough is the ability to change the look direction during flight. You may now fly in one direction while looking in another direction. This view shows the flight line in yellow and the look direction skewed to the left at 22 degrees.

The look direction is controlled with the slide bar at the bottom of the Flight Controls dialog. You may re-center your view to look forward by clicking the <Center> button →





Click the <Done> button to end the fly through. You can save your fly through as a movie by having checked the Save Movie box and giving the movie a name when you are done.

GPS Use with MicroDEM

MicroDEM will allow you to connect any GPS receiver, which outputs data via serial port in National Marine Electronic Association (NMEA) sentences, to your laptop to track your real-time position over your display. The newer, green PLGR and most commercial receivers have this capability. You will need the serial (RS-232) cable specific to your model GPS receiver; this is usually sold as an optional item. PLGR users will need the 15 pin-9 pin dual female cable for this which you can order through supply using **NSN: 6150-01-375-8664.**

If you are using a military Precise Lightweight Global Position System Receiver (PLGR), a commercial Eagle/Lowrance or Trimble GeoExplorer GPS receiver you can create GPS waypoints on your display and then download them into the GPS receiver to navigate by.

Using these same model GPS receivers you may also enter waypoints in your receiver as you travel and then download them into your computer for map display in MicroDEM .

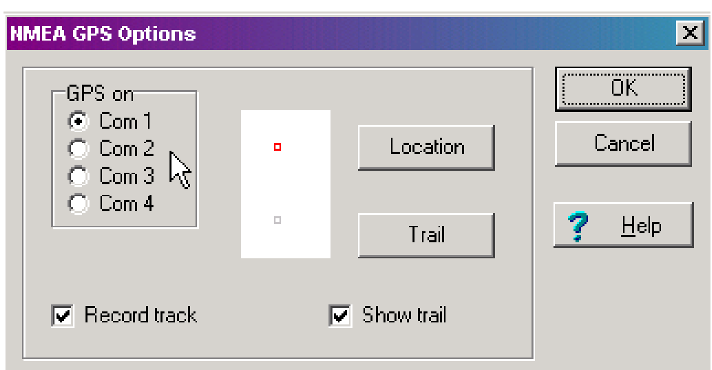
MicroDEM can use the recorded route to create a walk-through/fly-through movie.

Creating a GPS Position / Track Overlay

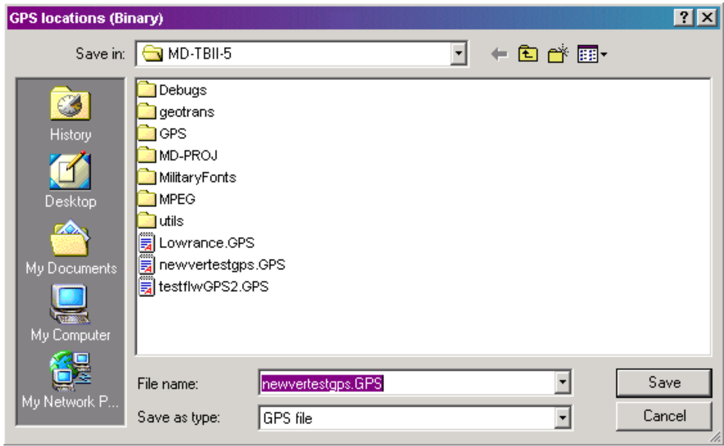
With your elevation, imagery or map data loaded, select the display you wish to use for your tracking by clicking on its title bar. The active display will have a highlighted title bar.

Make sure you have set up your Windows comm. ports correctly. Turn on your GPS and make sure you are receiving a signal. If you have not previously initialized your receiver it may take several minutes to get a good lock on the 3 to 5 satellites you'll need. Make sure your receiver is sending data to the computer Comm Port, and sending **WGS84** positions. Your receiver should be set to output **NMEA 183 output at 4800 baud, 7 data bits, 1 stop bit and no parity**. MicroDEM reads only the GPRMC string. See the user's manual for your specific model receiver.

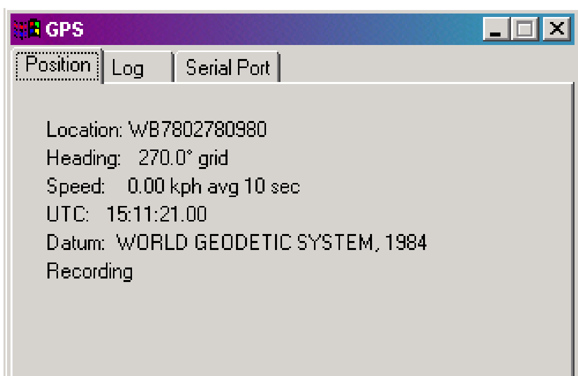
At the MicroDEM main menu select GPS/ START. This will bring up the NMEA GPS Options window.



Here you will select the comm. (RS-232) port you are using, and the desired location and trail symbology for your overlay. If you check the Record track box you will be required to provide a file name under which to save your track data. Clicking on the <OK> button will bring up the GPS Locations (binary) window.

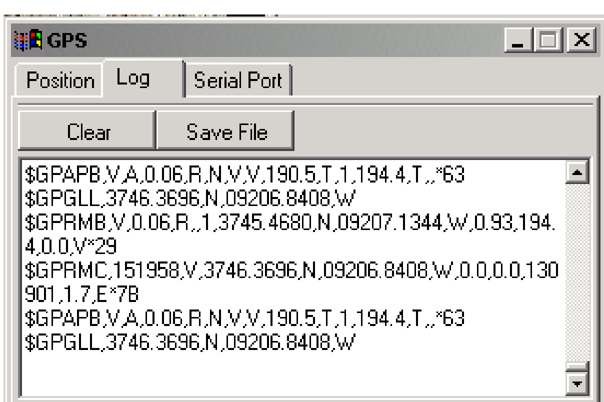


If you did not check the Record track box you will not save your data to your hard drive. In either case you will now get the GPS location readout window.

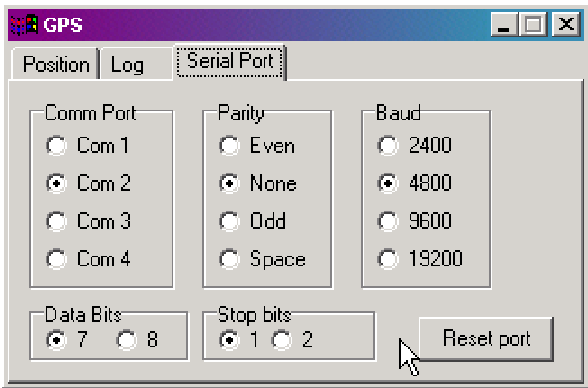


Here the location, heading, speed, Universal Time-Coordinated(Greenwich Mean Time) and receiver datum are listed. A point and time hack are dropped every two seconds.

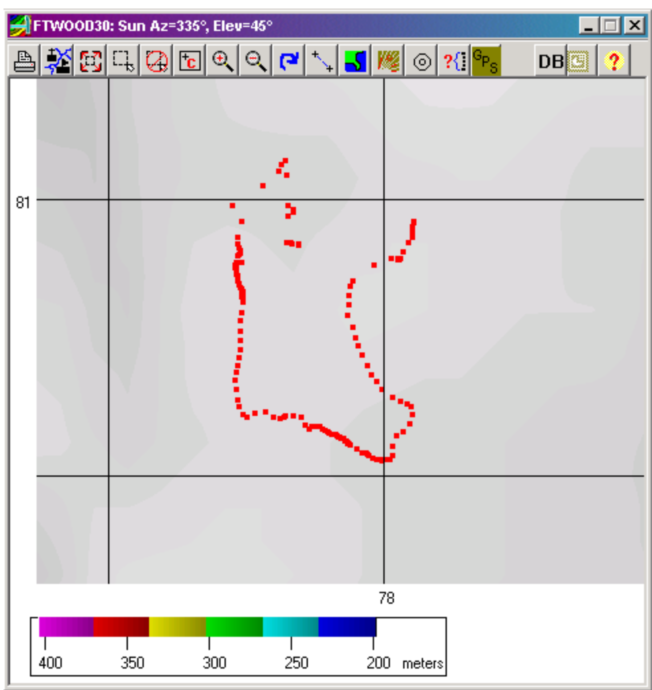
If you click on the Log tab you will see the NMEA sentences in raw form as they are dumped.



If you click on the Serial Port tab you will be given the opportunity to set up your computer's com port on-the-fly. This is a very handy feature to ease the communication setup between your GPS receiver and your computer.



You position will now be displayed real-time on your chosen map background.



NOTE: Redrawing a map will erase the GPS trail.

The speed and heading will be computed over a 20 second period or when the position has changed by 200 m, whichever comes first. You can set the units for this display by selecting Options at the main menu and clicking on the desired units radio button under the Units tab.

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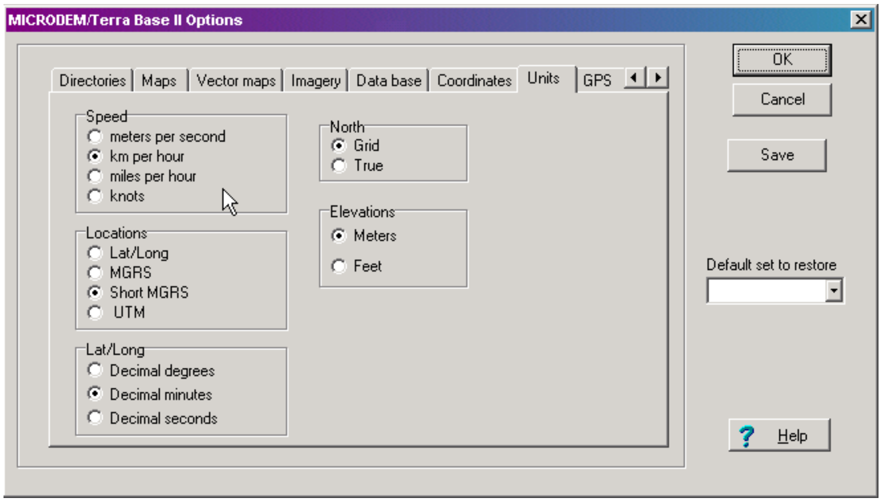


Changing units from the option menu during operation is not advised; changing the north option will result in erroneous displays of speed and heading for the next 20 seconds.

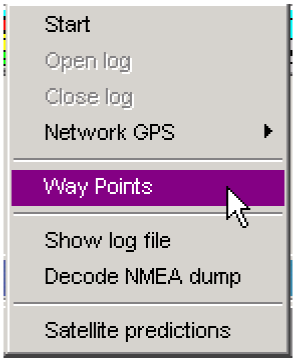
PLGR GPS Operations for Real Time Display

Insure the output is set for NMEA. Insure that the PLGR is set for CONTINUOUS operation. Insure that the five-minute automatic turn off is not selected. Use the MPS (Mission Planning Software). Insure that you have the special cable. Insure that the PLGR is set for STANDARD input and output via the serial port

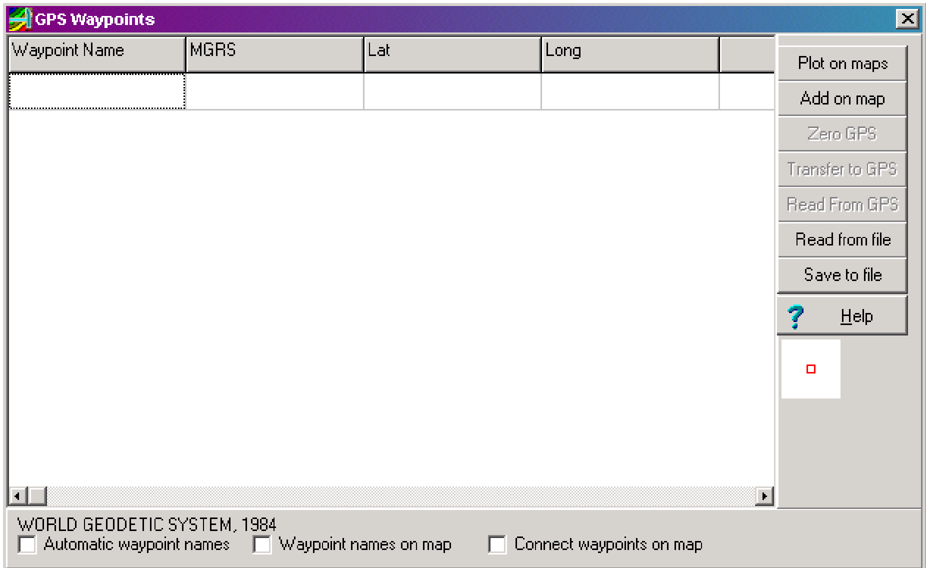
GPS Waypoints

With your elevation, imagery or map data loaded, select the display you wish to use to select your waypoints by clicking on its title bar. The active display will have a highlighted title bar.

At the main menu select GPS and Waypoints this will bring up the GPS pull down menu.



Pick the Waypoints menu choice from the menu.



The GPS Waypoints form has the following buttons:

- Plot on maps: plot the waypoints on each open map window, with the symbol shown at the bottom of the form.

- Add on maps: after selecting this, you can activate a map and select waypoints by double clicking on them. Select the locations of waypoints by double clicking. Confirm the suggested waypoint name, or modify the selection. The GeoExplorer can use 12 character waypoint names.

- Zero GPS: clear any waypoints from the GPS memory. You must confirm this selection. This will zero the locations, but the GPS (e.g. Eagle) may still think the points have valid data and may not reuse the waypoint slot.

- Transfer to GPS: load the waypoints into the GPS memory for the Trimble and Eagle GPS. For the PLGR this will save to a WPF file that you can use with the mission planning software.

- Read from GPS: read from the GPS for the Trimble and Eagle GPS. For the PLGR this will read from a WPF file created with the mission planning software.

- Read from File: read from the selected GPS waypoints (.WPF) file.

- Save to File: save to .dbf or .txt file with coordinates waypoint name and data/time.

The form has the following check boxes:

- Automatic waypoint names: automatic waypoints can be assigned, WPT1 to WPTnn.

- Waypoint names on map: when the waypoints are plotted, the name can be plotted next to the location. You can change the plotting symbol, its color and size, by double clicking on it.

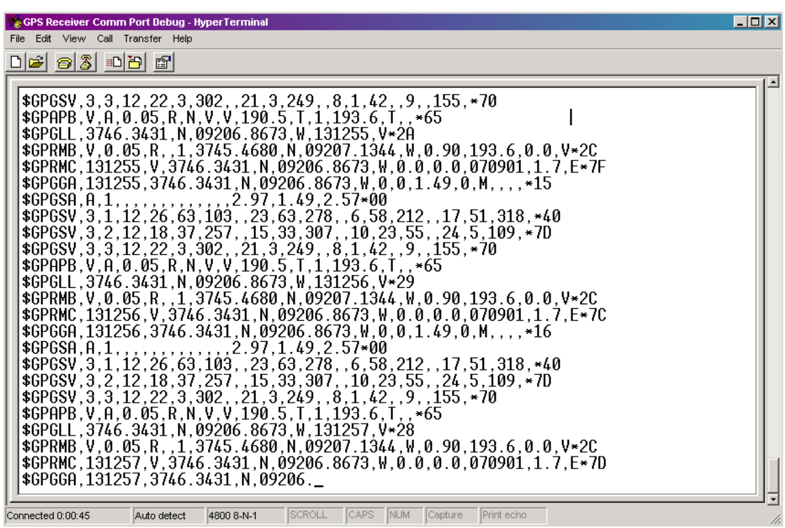
Trouble Shooting GPS Cable Connections with Hyperterminal

This shouldn't be necessary since you have the same capability now built into MicroDEM but I've retained this small section to educate users on Hyperterminal's flexibility.

If you can't get your GPS receiver to work with MicroDEM you need to check the following:

- Your GPS receiver must be capable of dumping NMEA 183 sentences via com port.
- When you setup your receiver to output in NMEA it should set its port to 4800 baud, 7 data bits, 1 stop bit and no parity but you should check this under the receiver's System Setup.
- When you setup your laptop you must also set up its com ports using the Control Panel <u>System</u> icon, System Properties' Hardware Device Manager. The Communications Ports are listed under Ports (Com & LPT). This should be set to greater than or equal to 4800 baud, 7 data bits, 1 stop bit and no parity.
- MicroDEM OPTIONS under the GPS tab are set to either <u>NMEA only</u> or the specific brand of GPS receiver.
- You have properly initiated recording of your track according to the technique list above.

You may have receiver trouble, cable trouble or you may simply be having trouble making your changes to the com port. If all else fails you can use Microsoft Windows built in Hyperterminal program to work out the problem. Hyperterminal lets you select a com port rather than a modem as your communications device. You may then set and test com port settings on-the-fly.



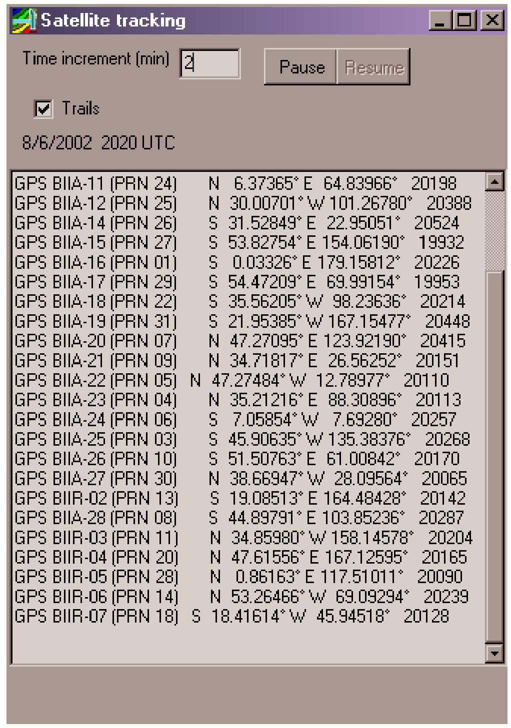
When you have your port settings are correct you will see the various NMEA sentences in readable text as they are dumped from the GPS receiver.

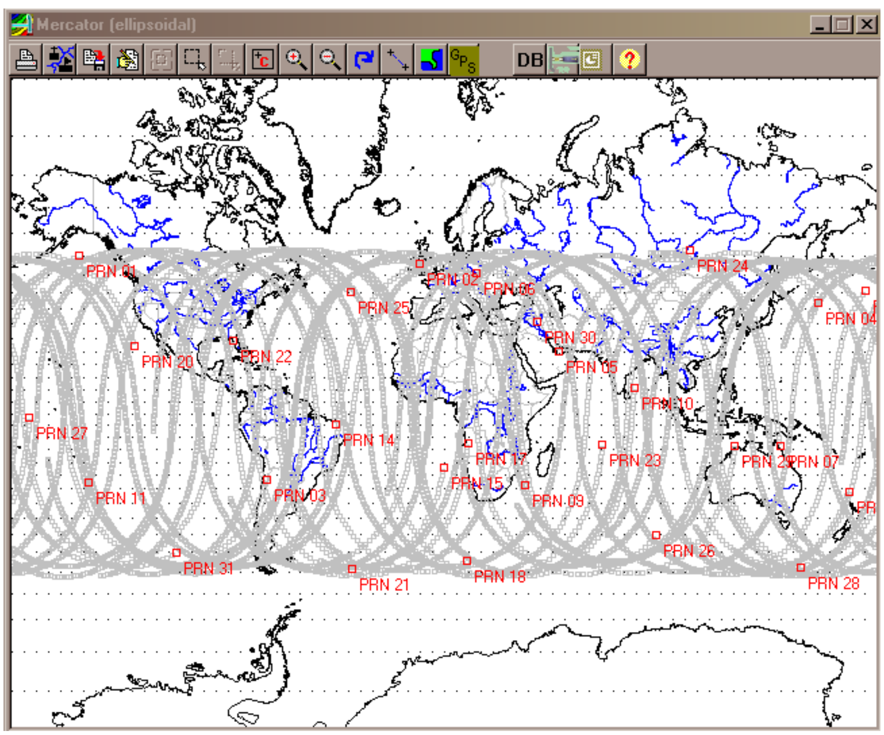
Satellite Prediction

This function allows you to predict the satellite geometry / locations over your area of interest for any given time. This will allow you to plan the best time of day to perform GPS operations.

The prediction model starts with current UTC Universal Time Coordinated (Zulu) and calculates the position of all NavStar satellites at (n) minute increments. The time increment is entered in the Time increment (min) data entry field.

The satellite number, lat/long and UTC time are listed in the Satellite Tracking dialog as they are generated.



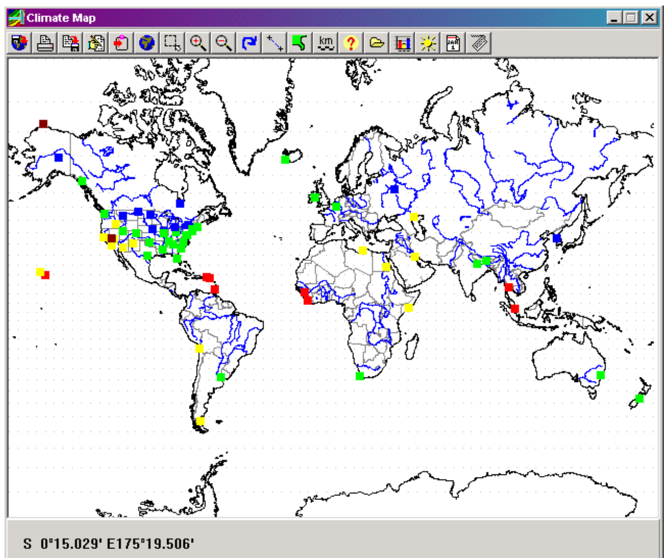


Locations for all NavStar satellites are plotted, as they are generated, on the world vector map. The individual paths may be plotted by checking the Trails box in the Satellite Tracking dialog.

Weather / Climatology

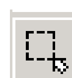
The KOPPEN CLIMOGRAPH provides climate information for 68 locations around the world. Climate information includes annual and monthly temperature and precipitation by number and graphical format. To access this tool go to the MicroDEM main menu and click on the

<KOPPEN CLIMOGRAPH >button→ 



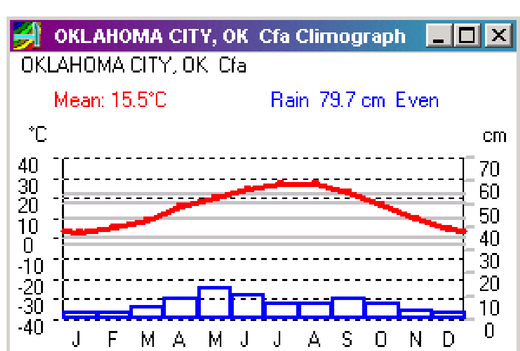
The Climate Map will open with a simple world vector map (world .sin) with small colored symbols representing cities with climate data.

If the city your are interested in is buried in a cluster of other cities you can click on the

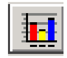
<ZOOM IN> button to perform a windows subset →. 

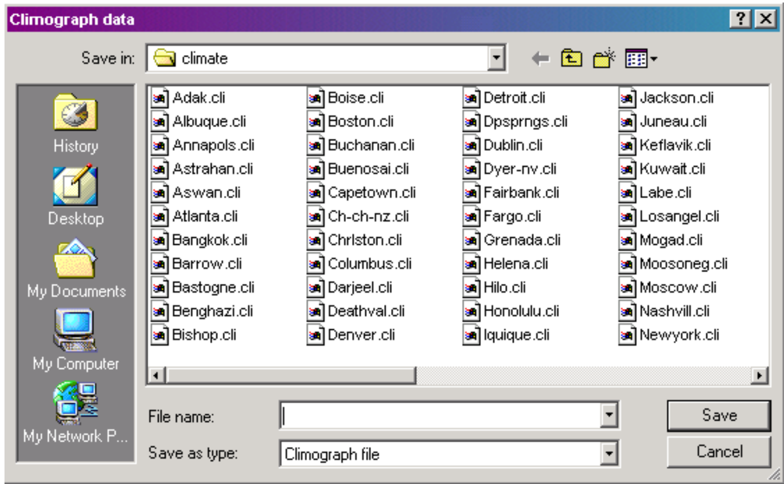
Now click on the Climograph on Click button → 

then double click on any of the city locations to get the annual temperature and precipitation data for that city.

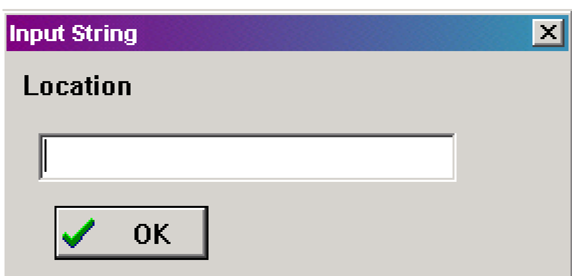


You can also enter your own climatic data for any location in the world by clicking on

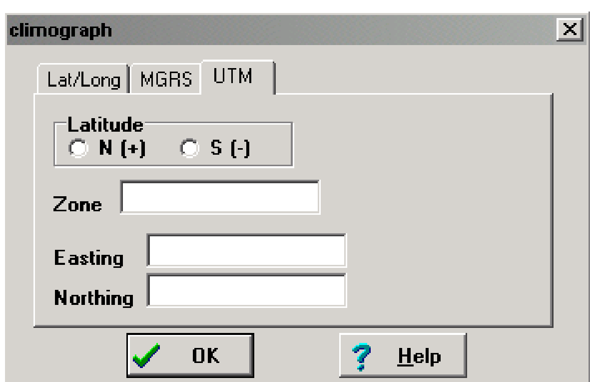
the <NEW CLIMOGRAPH> button → 



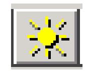
Here you will enter the file/city name for your new climograph.



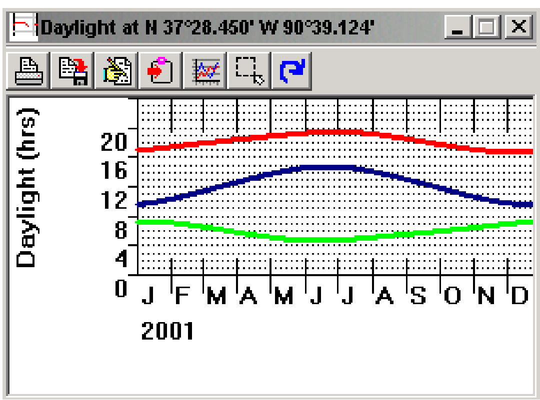
This will bring up the <u>Input String</u> pop-up window where you will enter the coordinates for the new climograph location.



This will bring up another window where you may enter the coordinates for the new climograph location.

You may display an annual graph of the sunrise/sunset and day-length for any location in the world by clicking on the < **DAYLIGHT ON CLICK>** button → 

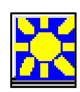
and then double clicking anywhere on your Climate Map.

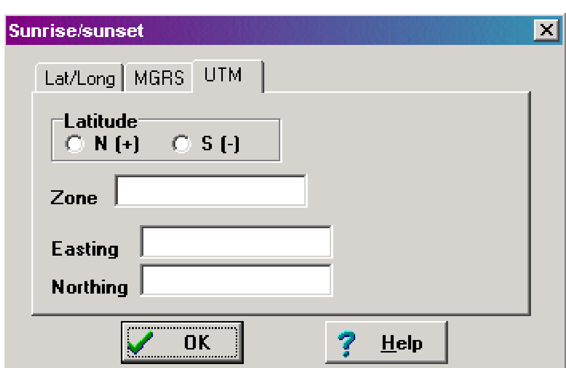


Solar and Lunar Data

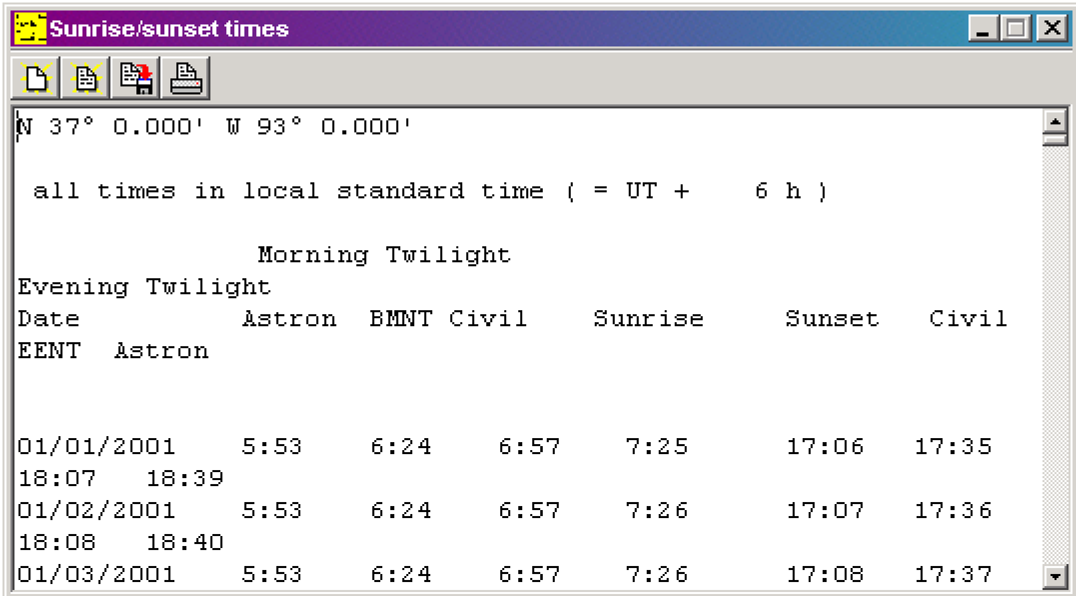
SUNRISE / SUNSET

This tool provides a tabular printout of the sunrise and sunset times, to include nautical (BMNT/EENT) and civil twilight for any location on earth, based on latitude and longitude.

At the main menu click on the <SUNRISE/SET> button → 



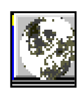
This will bring up the Sunrise/sunset window where you will enter the coordinate for the area you wish to investigate. This data may be entered in Lat/Long, MGRS or UTM by clicking on the tab for the coordinate format you wish to utilize.

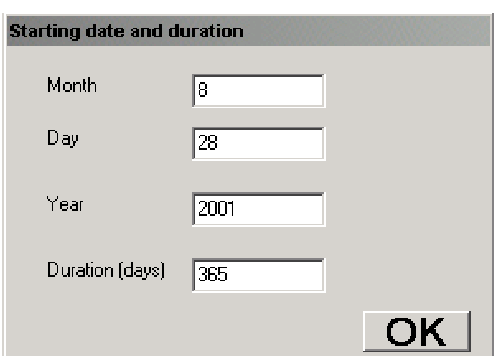


NOTE: This function does **not** adjust for Daylight's Saving Time (April – October), so you'll need to add one hour to the times shown if your area changes times.

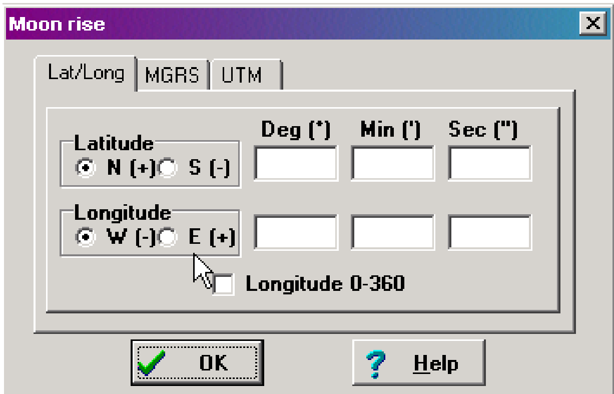
MOONRISE/MOONSET

This tool provides a tabular printout of the moonrise and moonset times for any location on earth.

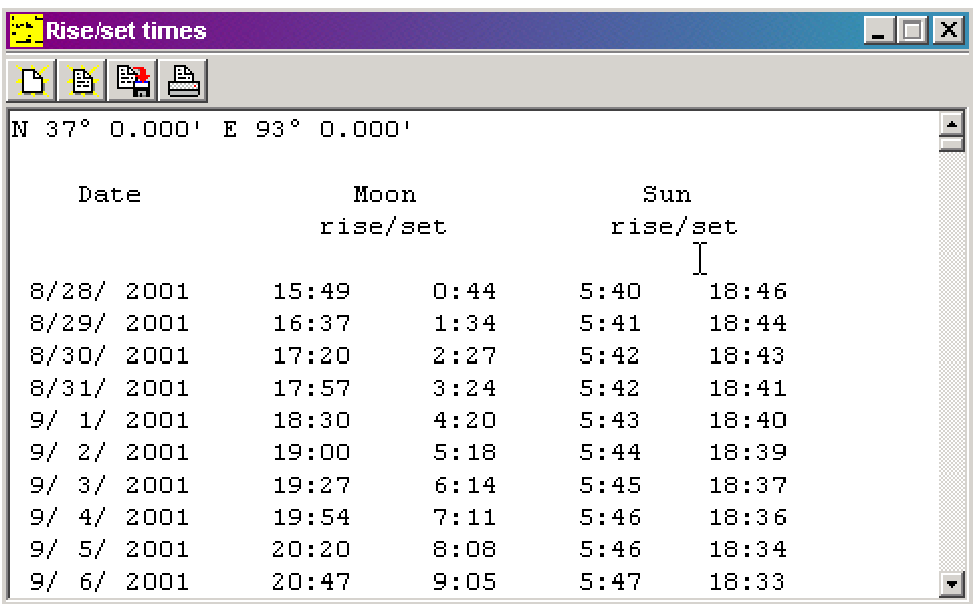
At the main menu click on the <MOONRISE/SET> button → 



This brings up the Starting date and duration window where you will enter the starting date by month, day and year and the duration or length of the table.



This will bring up the Moonrise data entry window where you will enter the coordinates for the area wish to investigate. This data may be entered in Lat/Long, MGRS or UTM by clicking on the tab for the coordinate format you wish to utilize. Moon phases are displayed on the bottom of this form.



NOTE: This function does **not** adjust for Daylight's Saving Time (April – October), so you'll need to add one hour to the times shown if your area changes times.

Chapter 8 Advanced Functions

This chapter covers several of the more esoteric features found in MicroDEM. These functions are either seldom used by the average MicroDEM user or require greater effort to utilize.

Pipeline Automated Planning Aid Version II
OpenGL 3D Views
Stereo Anaglyph
Export Geotifs from MrSID Viewer for Use in MicroDEM
Data Manipulation: Creating new NITF A.TOC Files
Loading and Using the USGS and NIMA Gazetteer
2D Shaded Relief Maps
Variable Opacity Merge

Pipeline Automated Planning Aid Version II

The PAPA function will allow you to delineate the route for your planned pipeline , will display a cross section of the route and will calculate how many SETS, KITS & OUTFITS you will need to construct the pipeline. Once graphed PAPA will allow you to edit and add or remove pump stations.

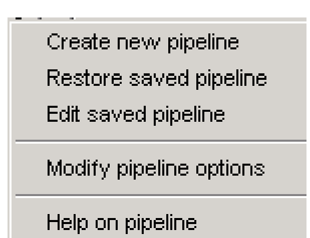
Two different methods of accessing and utilizing the PAPA function are listed in this section. The PAPA function may be accessed via the PAPA icon in your Windows Program Group or it may be started directly from MicroDEM by clicking on the <PL> PAPA- Pipeline button.

NOTE: The streamlined version of PAPA available from the program group limits you to using DTED, CADRG and CIB. The PAPA function available from regular MicroDEM will allow you to use a much wider variety of elevation, image and map data.

PAPA in MicroDEM

Start the PAPA function from MicroDEM by clicking on the <PAPA Pipeline> button → 

If you don't have a <PAPA Pipeline> button at your main menu then go to the main menu and select OPTIONS / MENU CHOICES tab and check the PAPA – pipeline box. This will bring up the PAPA choices menu.

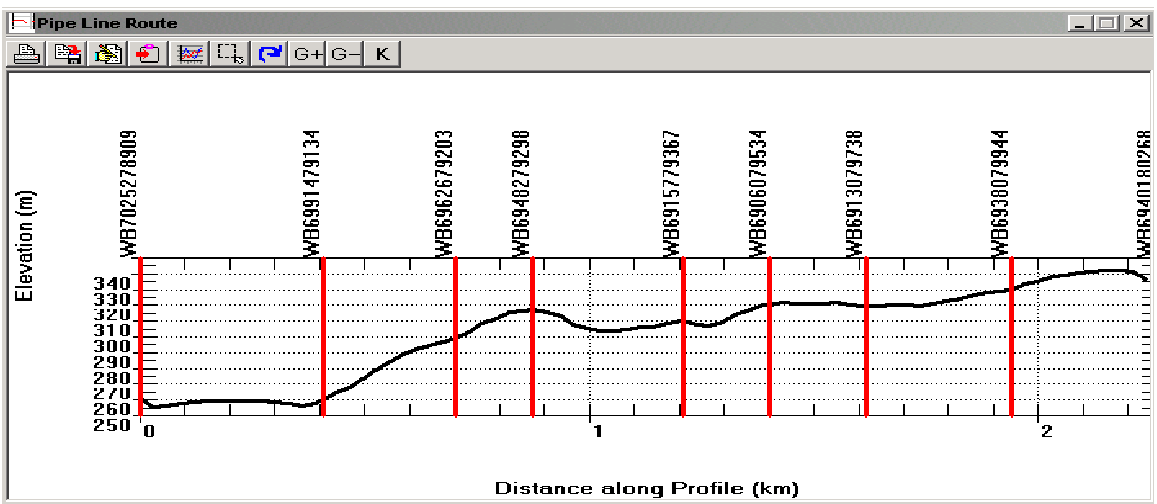


Here you can choose to define a new pipeline route, restore a previously saved pipeline, redisplay your old route over your background map to act as a guide in delineating a new route, or modify pipeline default options.

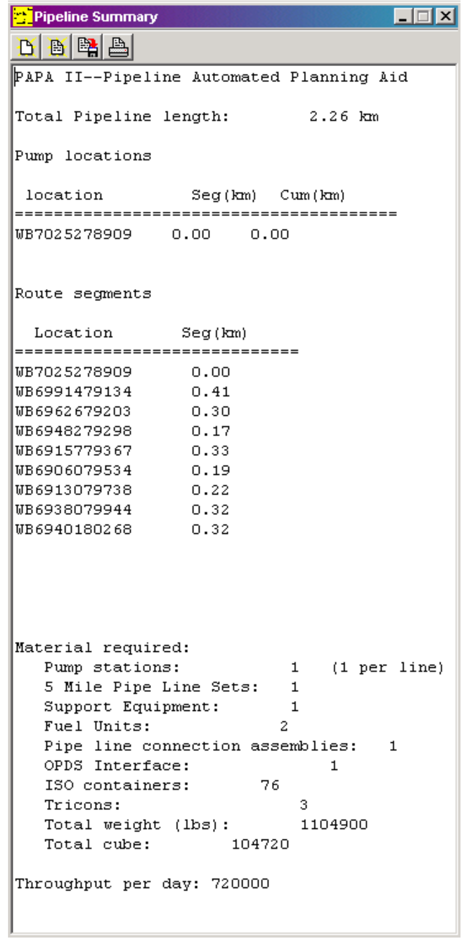
Selecting Create new pipeline will allow you to define your route. On your map display double click on the starting point for your route. Continue by double clicking on the intermediate points along your route and end by double clicking on the end point for your route.

When you've completed delineating the route right mouse click to bring up the End selection menu and click it → 

Two windows will be generated, one containing the graphical cross section of your pipeline route, the other containing the textual information for your pipeline summary.



This window may be rescaled by clicking on its edge or corner and holding down the left mouse button while dragging to resize the window. The horizontal scale shows the distance along the route in kilometers and the coordinate locations for your intermediate points/nodes along the route. The vertical scale shows the terrain relief along the route in meters.

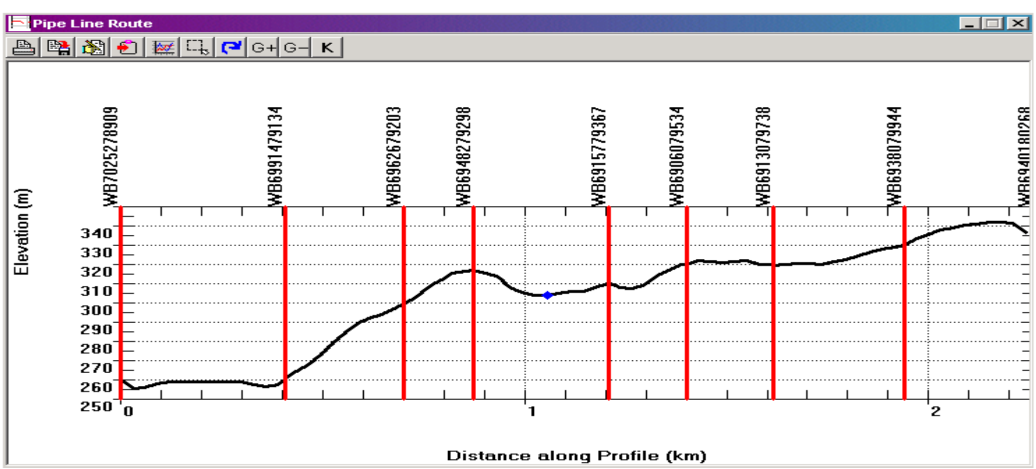


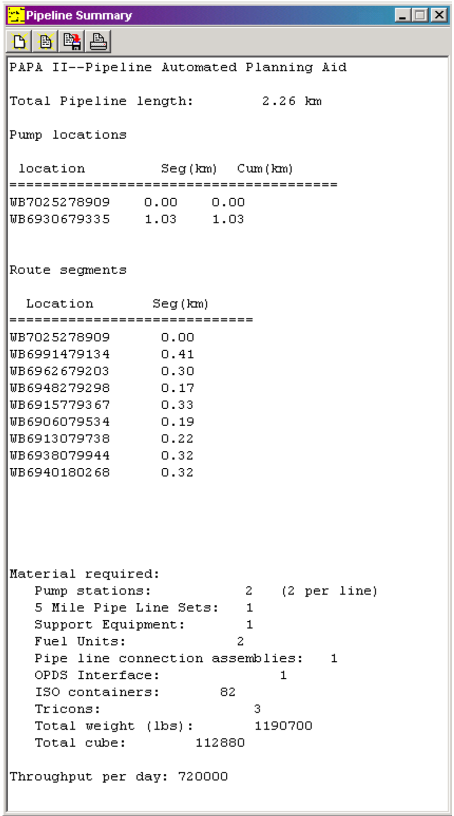
```
Pipeline Summary

PAPA II--Pipeline Automated Planning Aid

Total Pipeline length:        2.26 km

Pump locations

 location          Seg(km)   Cum(km)
=======================================
WB7025278909     0.00     0.00


Route segments

  Location        Seg(km)
=============================
WB7025278909       0.00
WB6991479134       0.41
WB6962679203       0.30
WB6948279298       0.17
WB6915779367       0.33
WB6906079534       0.19
WB6913079738       0.22
WB6938079944       0.32
WB6940180268       0.32



Material required:
   Pump stations:             1    (1 per line)
   5 Mile Pipe Line Sets:     1
   Support Equipment:         1
   Fuel Units:               2
   Pipe line connection assemblies:   1
   OPDS Interface:                1
   ISO containers:        76
   Tricons:                    3
   Total weight (lbs):        1104900
   Total cube:         104720

Throughput per day: 720000
```

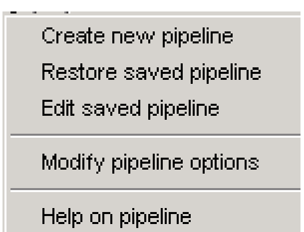
Additional pumps may be added or deleted anywhere along graphical cross section by clicking on

the <Add Pump Graphically>, <Graphical Remove Pump> and <K> buttons → 

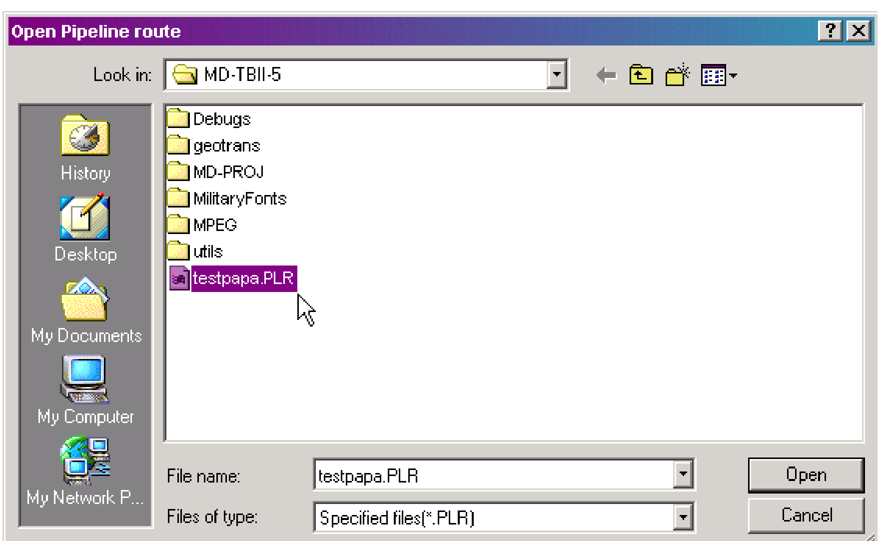
An icon for the pump will be placed on the graph and a new Pipeline Summary will be generated.



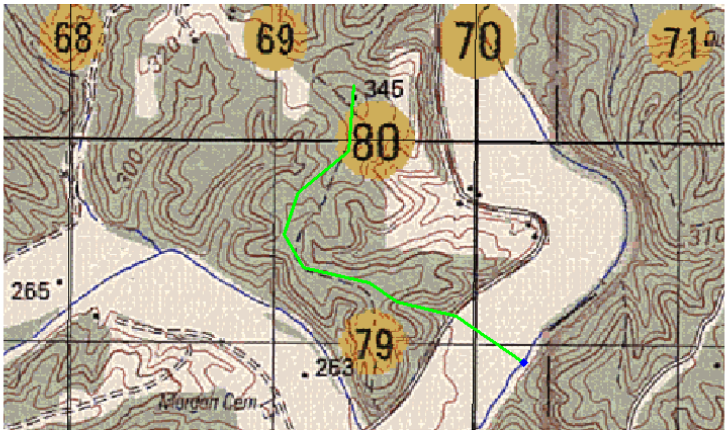




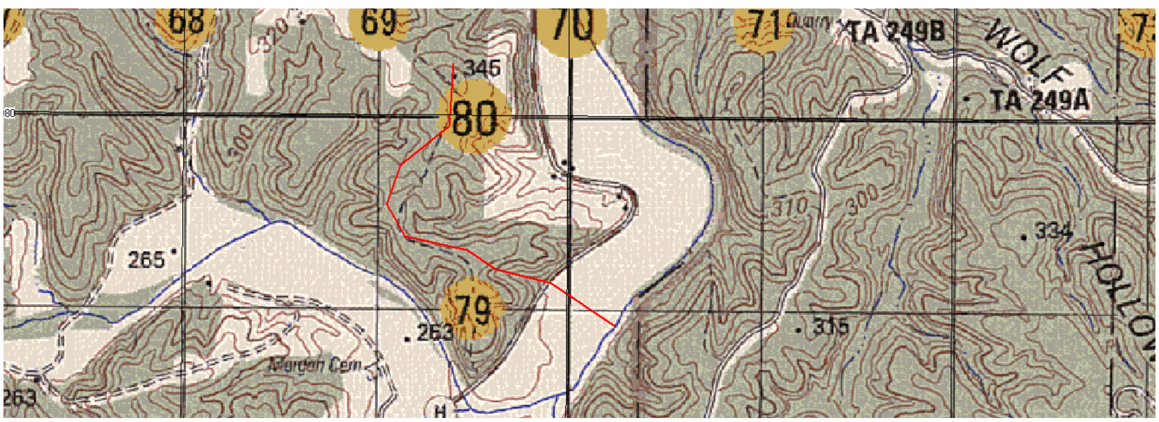
Selecting Restore saved pipeline will bring up the Open Pipeline route window.



Here you can select any previously saved PAPA (.PLR) file. This will redisplay the route over your background map and the two original PipeLine Route graph and Pipeline Summary windows.



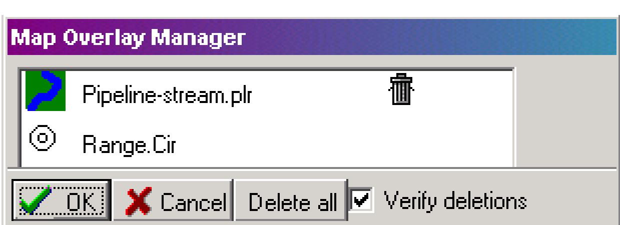
Selecting Edit saved pipeline will bring up the Open Pipeline route window where you can select any previously saved PAPA (.PLR) file. The original pipeline route will be redisplayed over your background image/map. You can drag any point on the route to reposition the route.

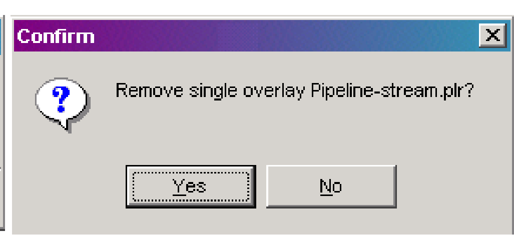


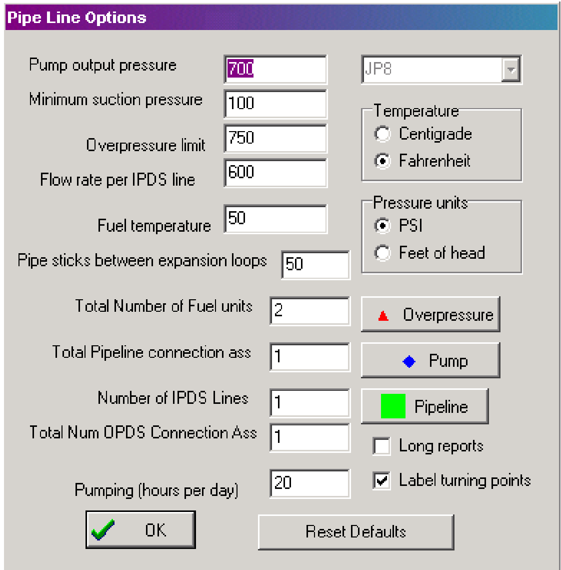
This will act as a guide as you redefine a new route.

Selecting Modify Pipeline Options will bring up the Pipe Line Options window.

Pipeline overlays may be removed by selecting OVERLAY / OVERLAY MANAGER at the main menu. This will bring up the Overlay Manager unless you have only one overlay in which case you'll get the Confirm – Remove single overlay pop-up window.



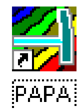




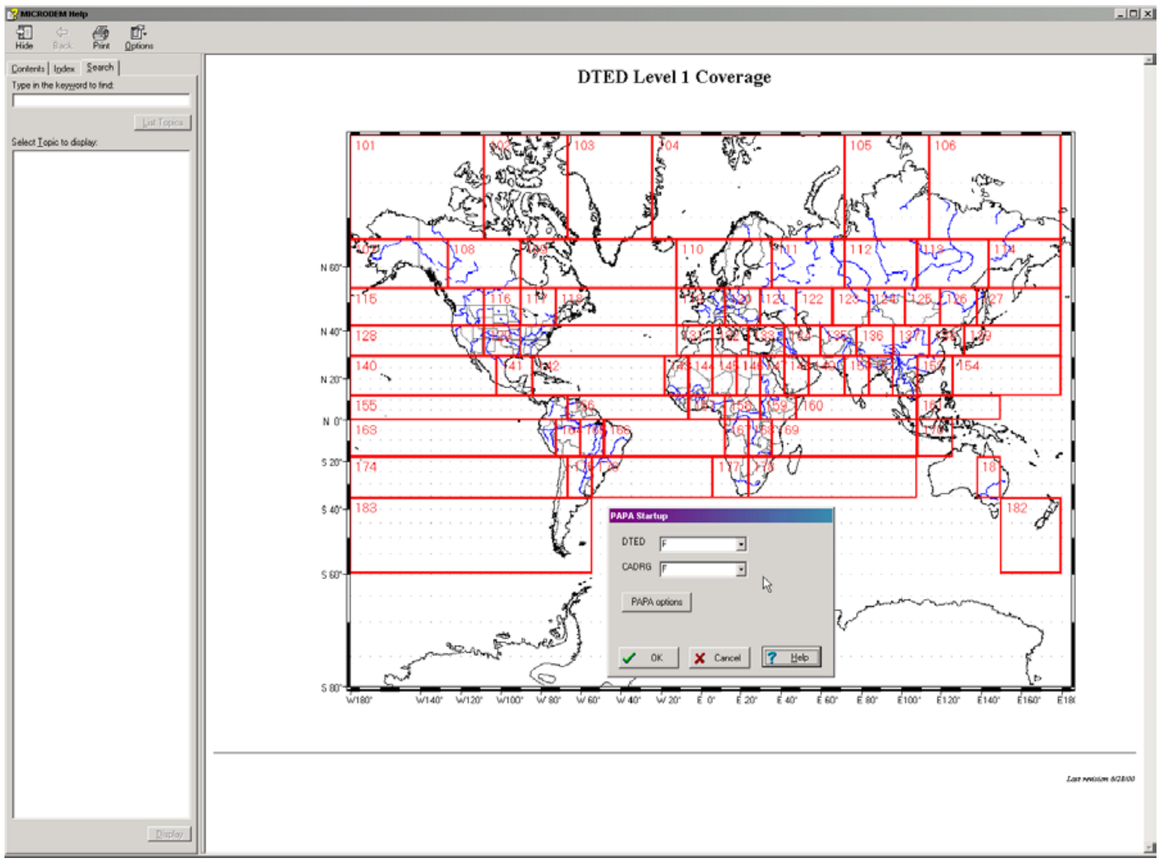
Here you may change a wide variety of default setting by simply typing the new value in each data entry field. Close this window by clicking on the <OK> button.

PAPA from the PAPA Icon

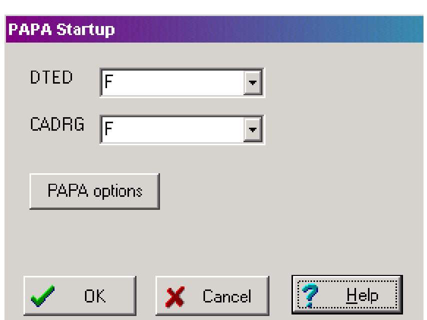
Click on the PAPA Icon in your MicroDEM program group →



The PAPA icon will start the program with a -PAPA command line parameter. This gives you a very restricted set of the menu options used only for creating pipelines. You must have the CDROMs with your elevation, map and (optional) imagery data on hand for this procedure.

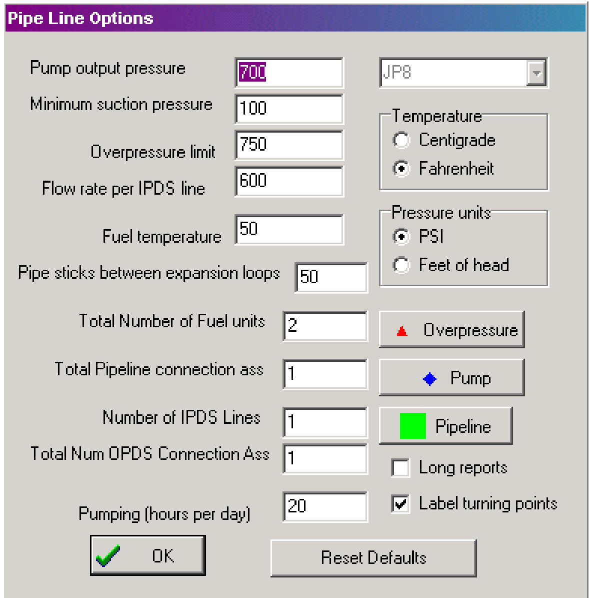


The program brings up a page from the HELP section showing world DTED Level 1 coverage and the PAPA Startup window.



Here you must identify the CDROM drive identification you will be using to load the data for your area of interest by selecting drive ID letters from the DTED and CADRG entry fields.

Alter default settings by clicking on the <PAPA options> button →



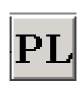
Here you may change a wide variety of default setting by simply typing the new value in each data entry field. Close this window by clicking on the <OK> button.

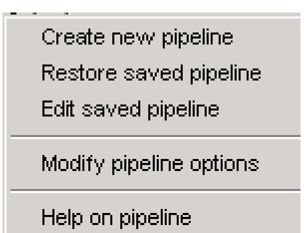
Click on the <OK> button in the PAPA Startup window to open the DTED for your region. Level 2 CDs, if available, will replace the 1xx series names with a 2xx name. They may also have a letter suffix, since up to 9 Level 2 CDs will be required for each level 1 CD; these suffixes do not appear to be standardized, but each CD should have a location map on the jewel case. You will only be able to work with the region for which you load DTED. See the MicroDEM HELP section on PAPA.

Open the CADRG for your region. You should use larger scale Joint Operational Graphics (JOG) or Topographic Line Map (TLM) products. Loading of the CADRG will now be done automatically. The CADRG covering the DTED you just loaded will be opened.

Open the CIB for your region. This is optional. You might prefer to define the pipeline route over CADRG or you might prefer CIB.

Click on the <PAPA pipeline> button at the main menu →

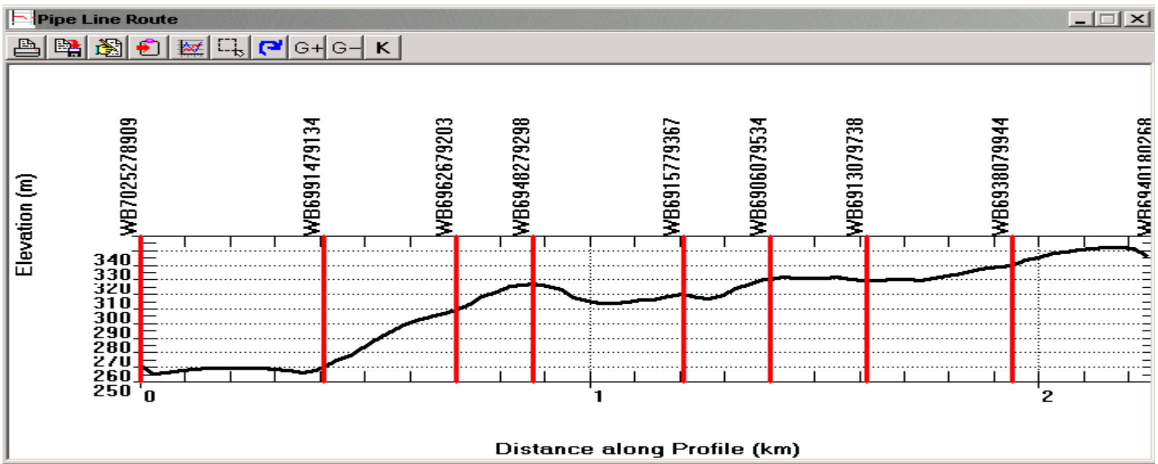




This will bring up the menu. Click on Create new pipeline to define a new pipeline route. Double click on the starting point for your route. Continue by double clicking on the nodes or intermediate points along your route and end by double clicking on the end point for your route.

When you've completed delineating the route right mouse click to bring up the End selection menu and click it → 

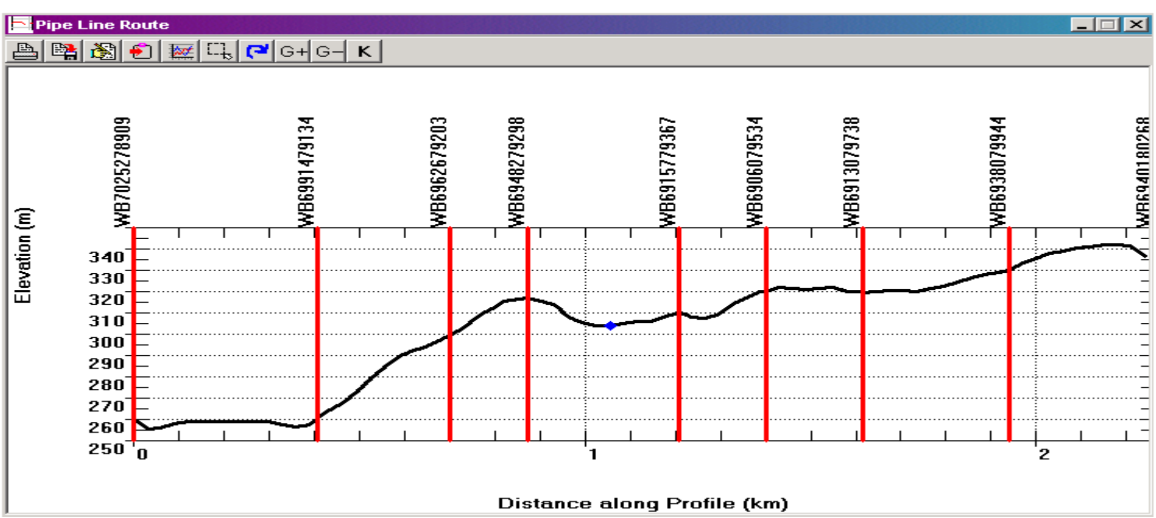
Two windows will be generated, one containing the graphical cross section of your pipeline route, the other containing the textual information for your pipeline summary.

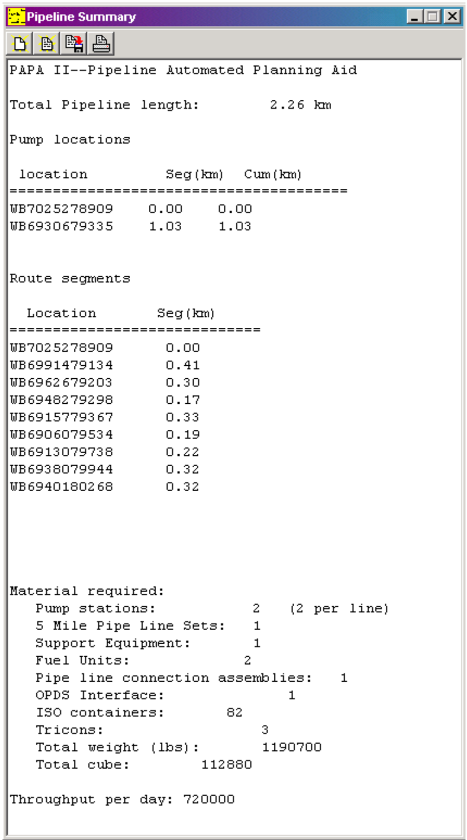


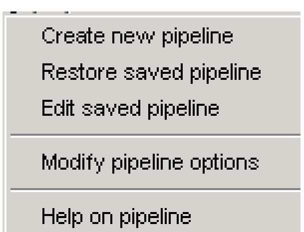
This window may be rescaled by clicking on its edge or corner and holding down the left mouse button while dragging to resize the window. The horizontal scale shows the distance along the route in kilometers and the coordinate locations for your intermediate points/nodes along the route. The vertical scale shows the terrain relief along the route in meters.

Additional pumps may be added or deleted anywhere along graphical cross section by clicking on the <Add Pump Graphically>, <Graphical Remove Pump> and <K> buttons → 

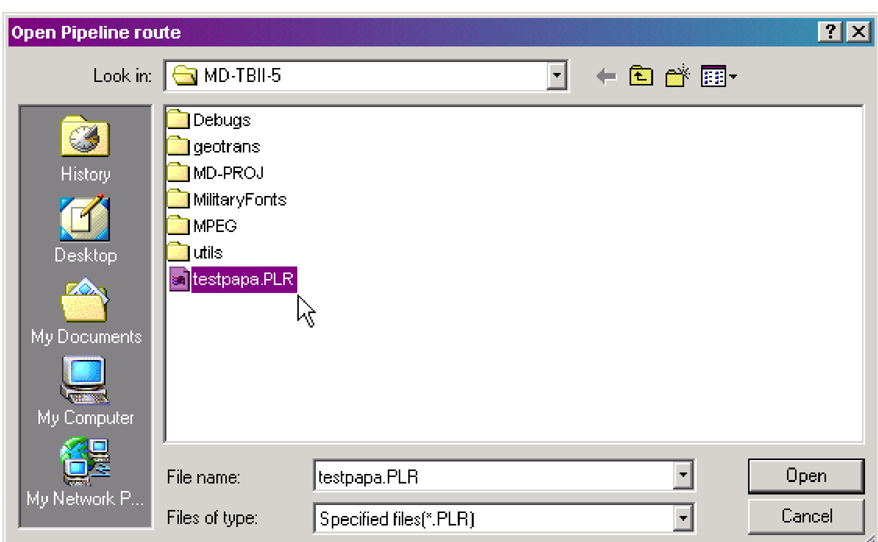
An icon for the pump will be placed on the graph and a new Pipeline Summary will be generated.



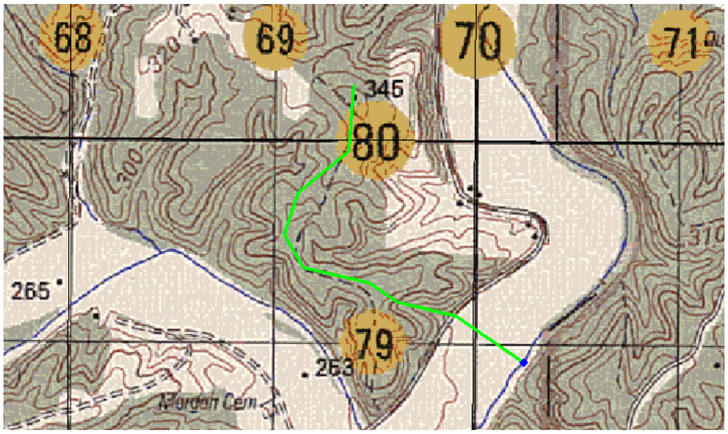




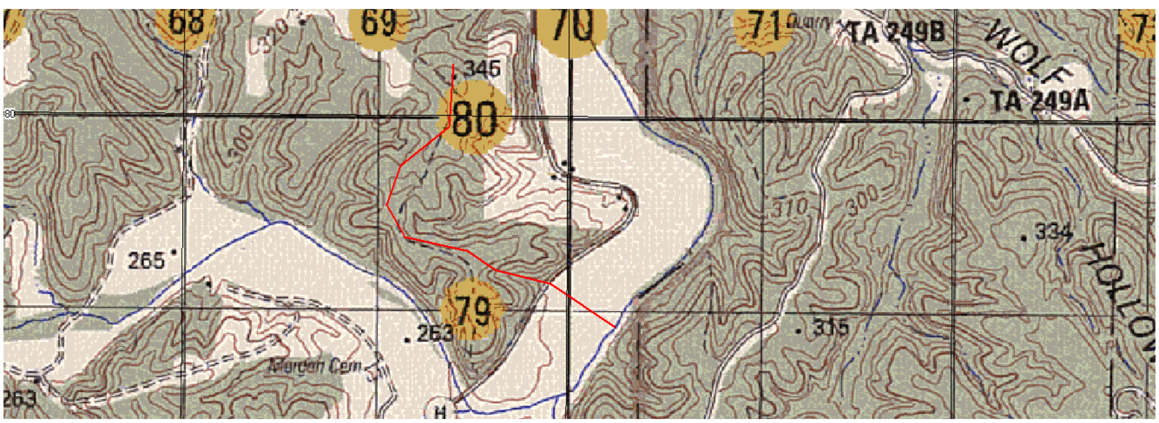
Selecting Restore saved pipeline will bring up the Open Pipeline route window.



Here you can select any previously saved PAPA (.PLR) file. This will redisplay the route over your background map and the two original PipeLine Route graph and Pipeline Summary windows.

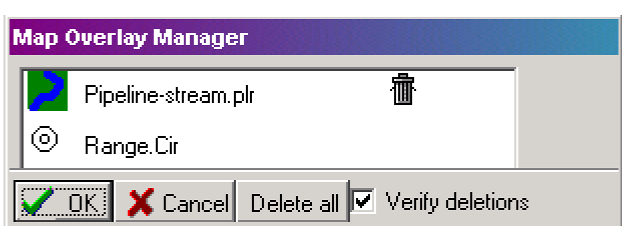


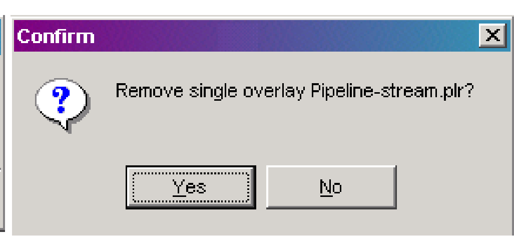
Selecting Edit saved pipeline will bring up the Open Pipeline route window where you can select any previously saved PAPA (.PLR) file. The original pipeline route will be redisplayed over your background image/map.



This will act as a guide as you redefine a new route.

Pipeline overlays may be removed by selecting OVERLAY / OVERLAY MANAGER at the main menu. This will bring up the Overlay Manager unless you have only one overlay in which case you'll get the Confirm – Remove single overlay pop-up window.





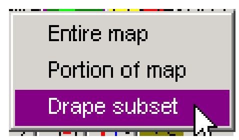
OpenGL 3D Views

OpenGL is a new interactive function to display draped imagery and maps over elevation data. It requires that you have OpenGL installed on your machine.

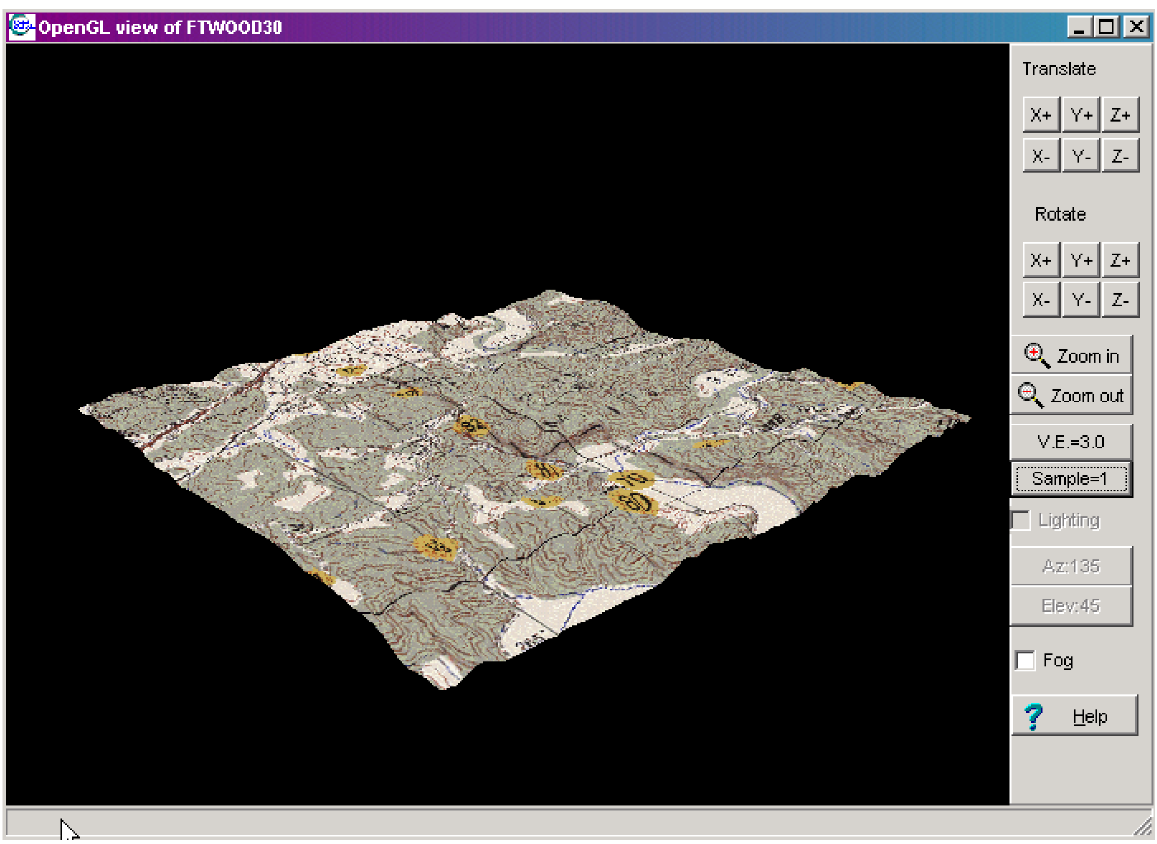
Load the elevation data for your area of interest. Load the imagery and/or map data for your area of interest. OpenGL views may be created over elevation displays, imagery or map displays but you must always have your elevation data loaded for your AOI.

Click on the display you wish to use as your drape. Note that the title bar is now highlighted. At the main menu bar click on the <OpenGL> button →

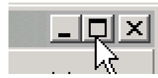
This will bring up the OpenGL menu.



Select <u>Drape subset</u> from the menu then click on the northwest corner of your area of interest, hold down the left mouse button and drag the reverse-video box to the southeast corner of your area of interest.



An interactive 3D display of your AOI will be generated, as shown above. The default size of your 3D display is 640x480 pixels.

Click on the <Maximize> button → 

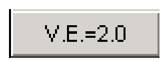
This button is located at the top right corner of your OpenGL 3D display. Clicking on this button will enlarge the display to full screen mode.

The resolution of your image will be low at first, because the sampling rate is initially set to a low value. You will probably want to immediately change your sample value by

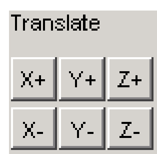
clicking on the <Sample> button → 

This button shows the current sample value. The sample value is a ratio of pixels available to those displayed. Sample=4 means that (1:4) only every fourth pixel in every fourth row is displayed. You can lower this ratio to a max value of Sample=1 where (1:1) every pixel available is displayed. Sample=1 uses 16 times more memory than sample=4.

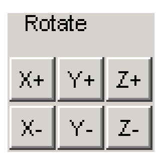
NOTE: Large areas of high-resolution imagery will stress the capabilities of your computer. A faster CPU and more RAM will improve the performance of this function. Watch the lower left corner of the OpenGL display. This area will show the number of triangles that have been processed during the redisplay of your image. The maximum number of triangles is set at the Views tab of the Options menu. There will be two triangles for every "block" within the DEM. To get under the limit, the data will be sub-sampled, which will be shown on the <Sample> button. More triangles means more time to generate each view.

Click on the <Vertical Exaggeration> button → 

This button shows the current vertical exaggeration value. Areas of low relief usually need to have their vertical-scale exaggerated in order to look right.

Click on any of the <Translate> buttons → 

These controls are used to move the 3D view within the OpenGL display along any of its three axes.

Click on any of the <Rotate> buttons → 

These controls are used to rotate the 3D view within the OpenGL display about any of its three axes.

Addition controls are available for reflectance plot of elevation data only. These controls are used if you elect to use the Entire Map or Portion of Map options from the OpenGL menu.

- Lighting: if you enable lighting, a drape subset will be transformed into a DEM only view with lighting. There is no switching back one lighting is selected.

- Azimuth: sun location for lighting
- Elevation: sun elevation, above the horizon, for lighting

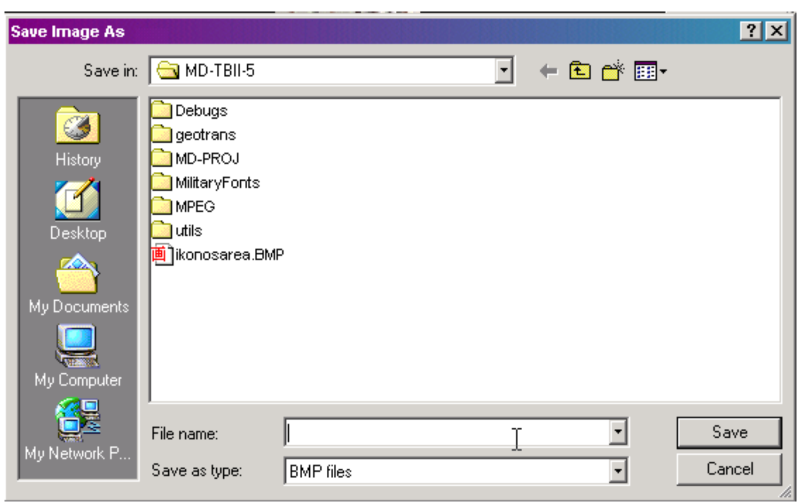
- Fog: turn fog on or off.

Additional Options are available by right clicking on your OpenGl 3D display.

Selecting Back Ground Color from the menu will bring up the color selection window for your OpenGL 3D display's background

.

The Save image option will bring up the Save Image As window.



Here you can save the 3D display as a .BMP, .JPG or .GIF image.

Selecting Print Image from the menu will perform a quick plot of the 3D display to your default printer.

Selecting Add to Power Point from the menu will copy the display to a new slide in your Power Point presentation.

Stereo Anaglyphs

3D stereo imagery is viewable with red/blue glasses.

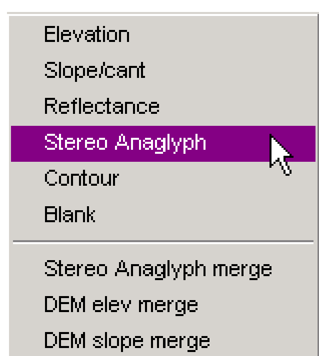
See the MicroDEM HELP section on Sources of 3D Anaglyph Glasses.

The Terrain Visualization Center web site lists three of many sites selling a wide variety of red/blue glasses in paper and plastic. The URL for the specific TVC web page is **http://www.wood.army.mil/TVC/MicroDEMV5/ordering_redblue_glasses.htm.**
These links are not intended as an endorsement of these specific sites but are merely provided as a service to the MicroDEM/TerraBase II GIS community.

Stereo imagery may be produced in 2D map views, 3D Perspective views and in movies. Three-dimensional images may be produced over elevation data, imagery or maps but you must always have your elevation data loaded.

To produce a simple stereo view of your elevation data simply right click on your display to bring up the first pop-up menu. Select Display parameter, this will bring up the second pop-up menu.

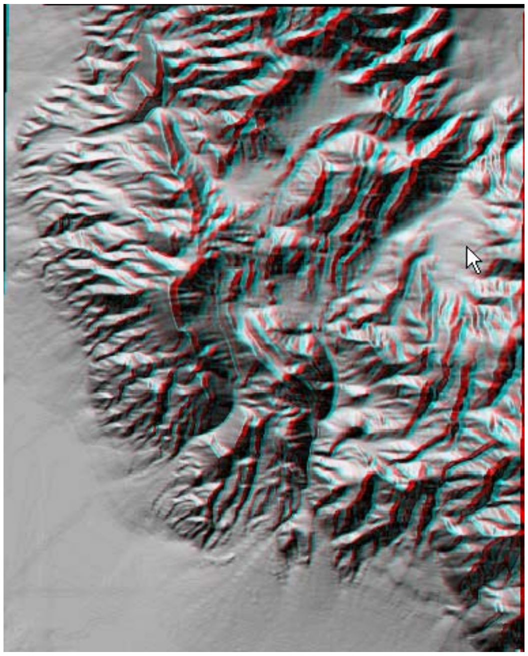
→



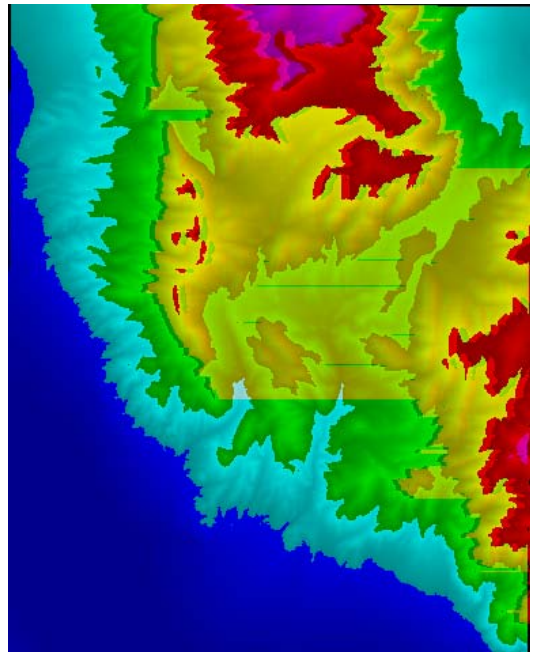
Select Stereo Anaglyph if you want to display your image as a 3D gray-scale shaded relief.

Select Stereo Anaglyph merge if you want to display your image as a 3D color Elevation Tint.

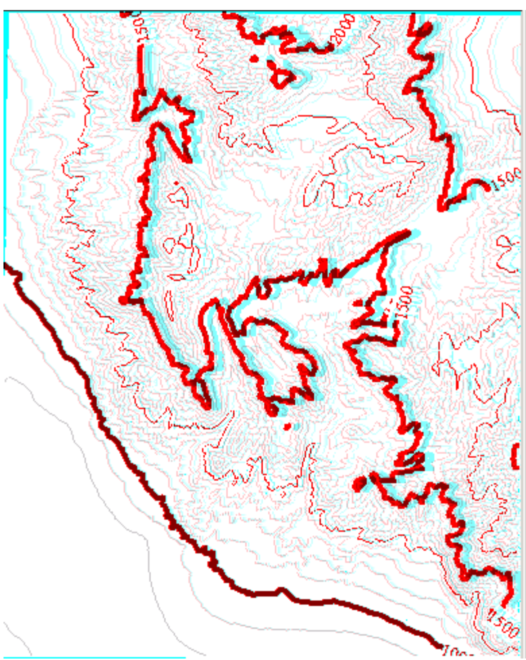
You may use this same function to display your elevation data as 3D contours by first selecting Display parameter from the first pop-up menu then selecting Contour and then Stereo Anaglyph merge from the second pop-up menu.



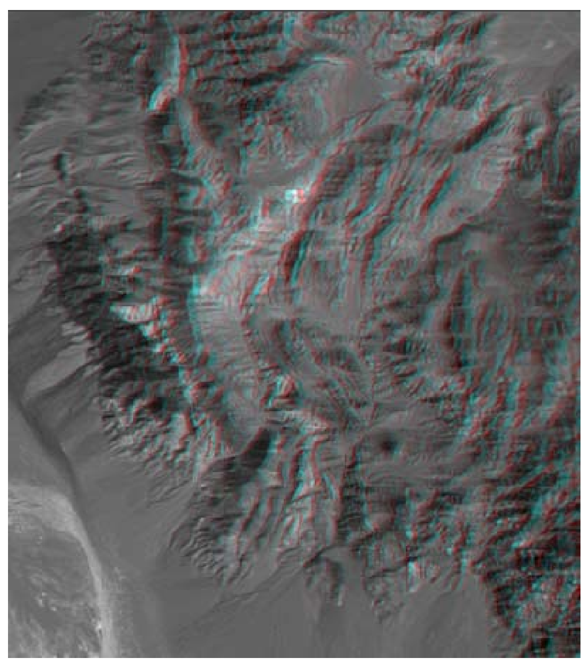
Shaded Relief Stereo Anaglyph of Elevation Data



Elevation Tint Stereo Anaglyph of Elevation Data

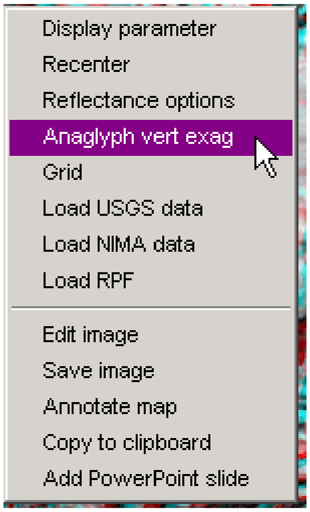


Stereo Anaglyph of Contours from Elevation Data.

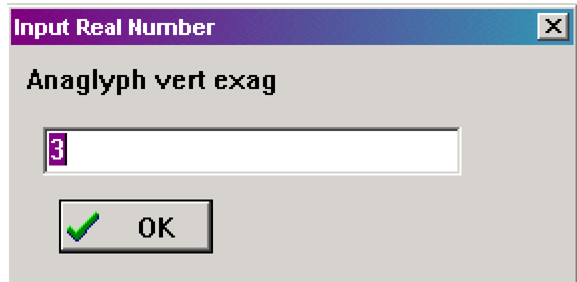


Anaglyph of Imagery Draped over Elevation Data.

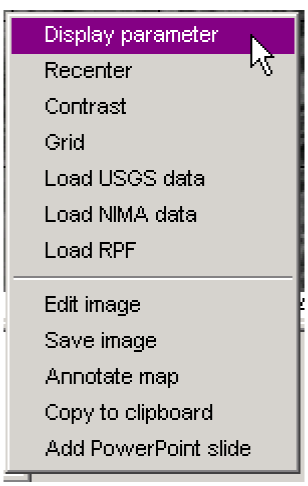
You may adjust the vertical exaggeration of your stereo anaglyph by right clicking on your display to bring up the pop-up menu and selecting Anaglyph vert exag. This will bring up the Input Real Number window where you will enter the desired vertical exaggeration value.



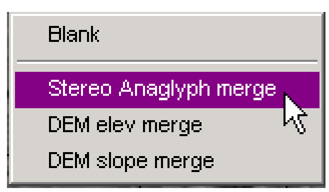
→



To produce a draped stereo view of your image or map data simply right click on your image or map display to bring up the first pop-up menu. Select Display parameter, this will bring up the second pop-up menu.



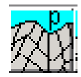
→

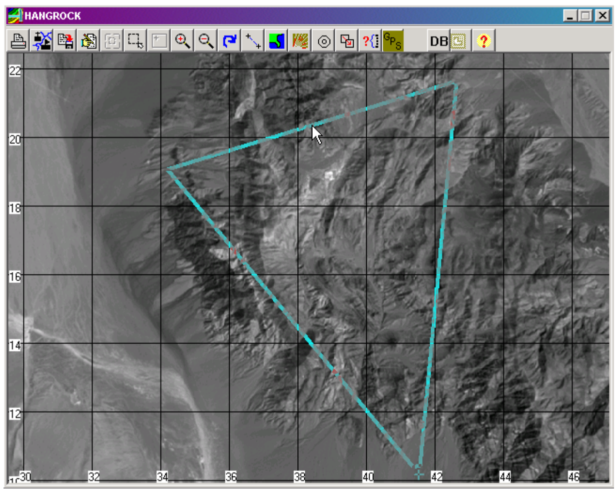


Select Stereo Anaglyph merge to display your image or map as a 3D stereo anaglyph as shown on the previous page.

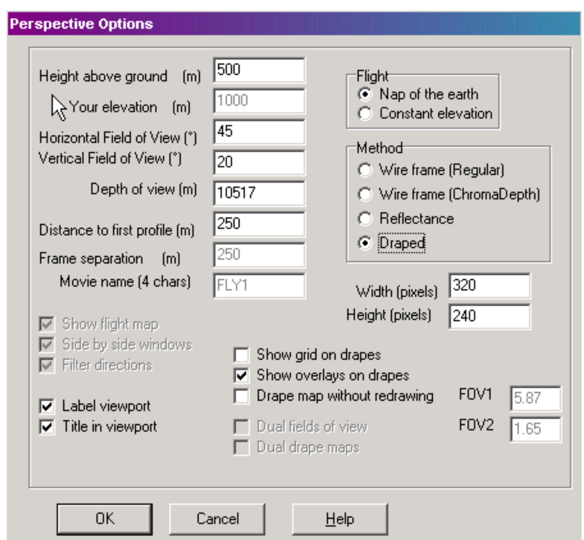
NOTE: Creating stereo anaglyph views of high contrast color displays such as the Elevation Tint is not recommended since the resulting anaglyph may be smeared and difficult to view.

To produce a 3D Perspective View load your elevation data and your image or map data.

Click on the <PERSPECTIVE VIEW> button→ 



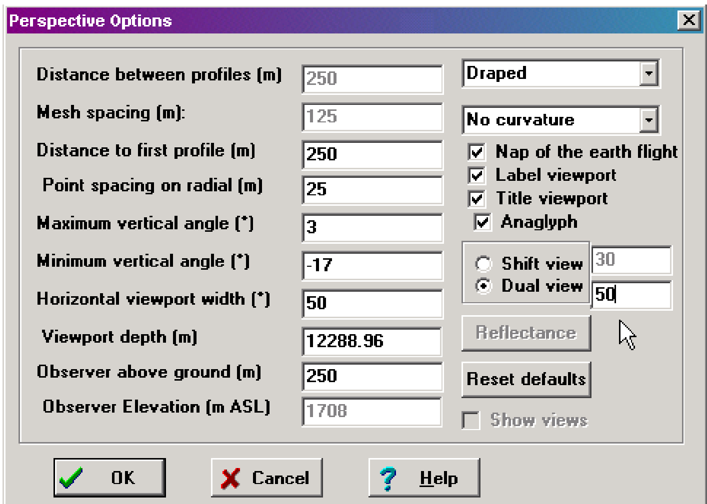
Select the observer's position for your perspective view by double clicking on the image or map display with the mouse. As you move your mouse to the end of your field of view you will notice a reverse-video triangle. This triangle shows the area that will be visible in your perspective view. Double click on the end of your field of view to bring up the Perspective Options window.



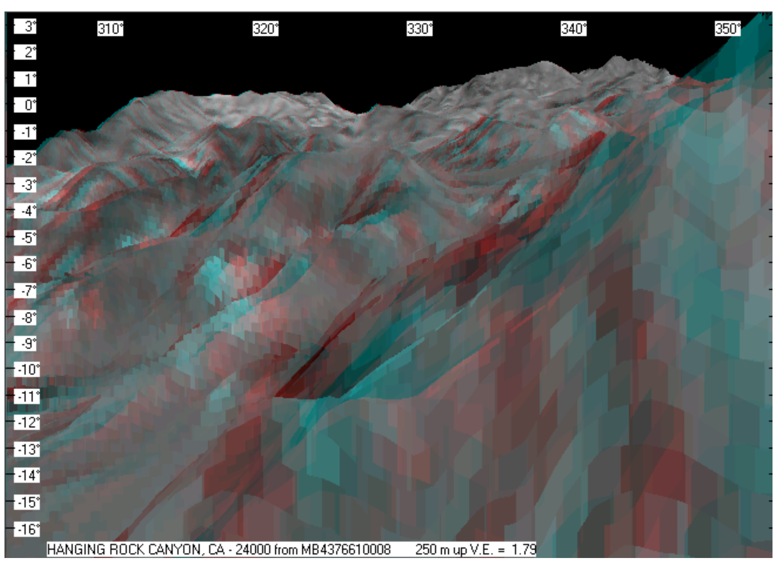
Here you should enter the observer's height above the ground or the observer's elevation above sea level. Selecting Nap of the earth will use the observer's height above the ground. Selecting Constant elevation will use the observer's elevation above sea level. Normally you would select Draped under the Method section. The Width (pixels) and Height (pixels) data entry fields will determine the original size of the perspective view. Don't worry about any of the other settings for now. You can experiment with other settings at your leisure.

NOTE: The Perspective View may be enlarged or reduced in size by simply clicking on the border of the display and dragging to resize the display as you would any other window.

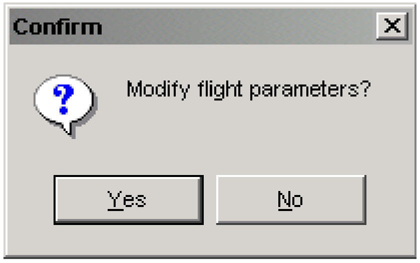
Once the Perspective View is displayed, right click on the display to bring up the second Perspective Options window.



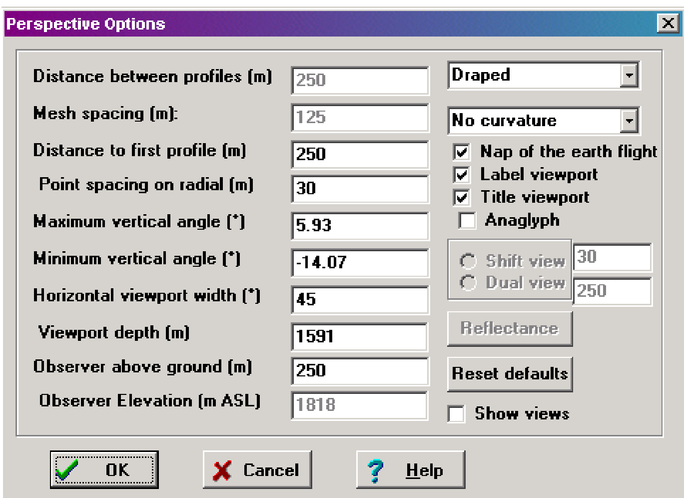
Here you can change a variety of parameters for the view. To enable the stereo anaglyph check the Anaglyph box and select either the Shift view or Dual view radio button. The Shift View option produces a quick perspective view without parallax. The Dual View option produces a more accurate perspective view with parallax. If you select the Dual view you will need to reduce the default value from 250. I usually use a value of about 50 but you may find that some other value suites you better. The correct value depends on the scale of the DEM used.



3D Movies are created using the same methodology. Once you've started generating the individual frames of your movie simply click on the <Abort processing > button on the Drawing Perspective n/n pop-up window. This will bring up the Confirm Modify Flight Parameters pop-up window.

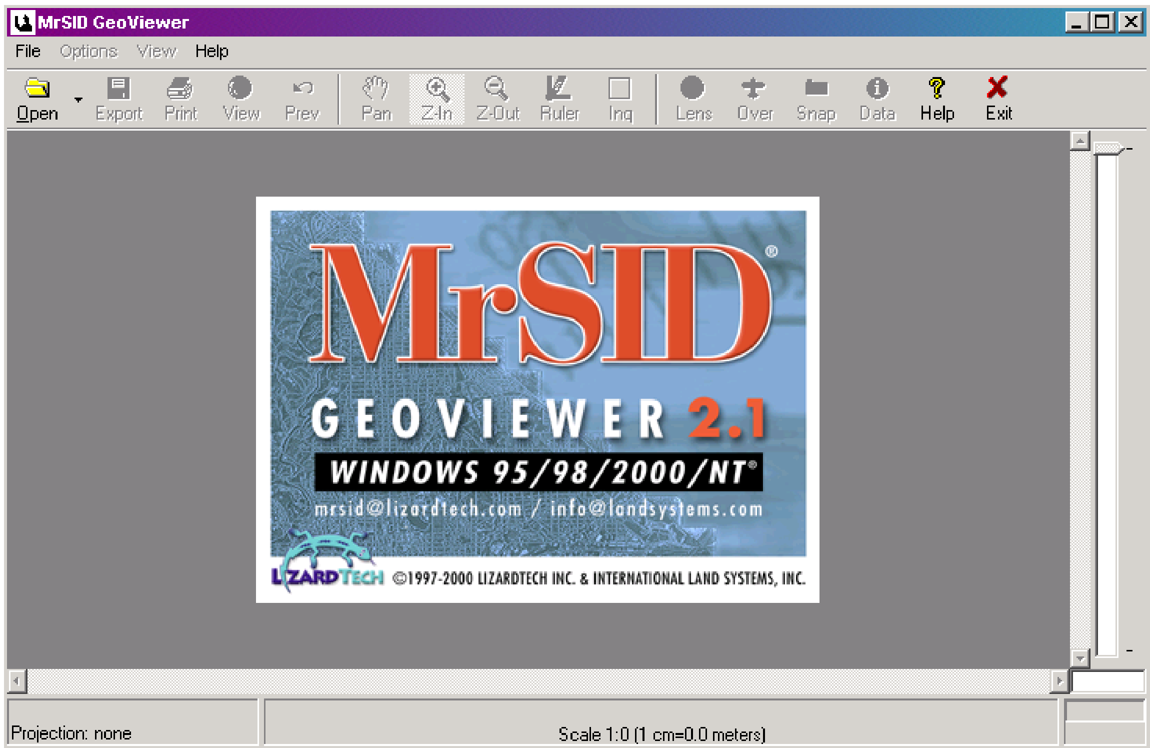


Clicking <YES> on the Modify flight parameters window will bring up the Perspective Options window.



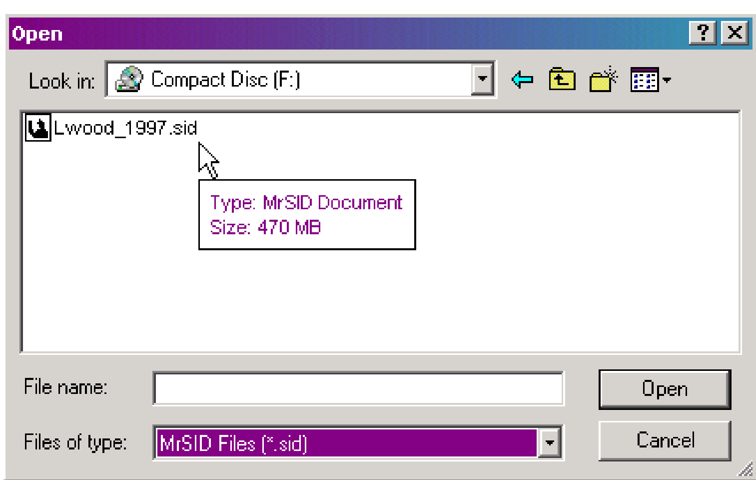
Here you can change a variety of parameters for the view. To enable the stereo anaglyph check the Anaglyph box and select either the Shift view or Dual view radio button. The Shift View option produces a quick perspective view without parallax. The Dual View option produces a more accurate perspective view with parallax. If you select the Dual view you will need to reduce the default value from 250. I usually use a value of about 50 but you may find that some other value suites you better.

Export Geotifs from MrSID Viewer for Use in MicroDEM



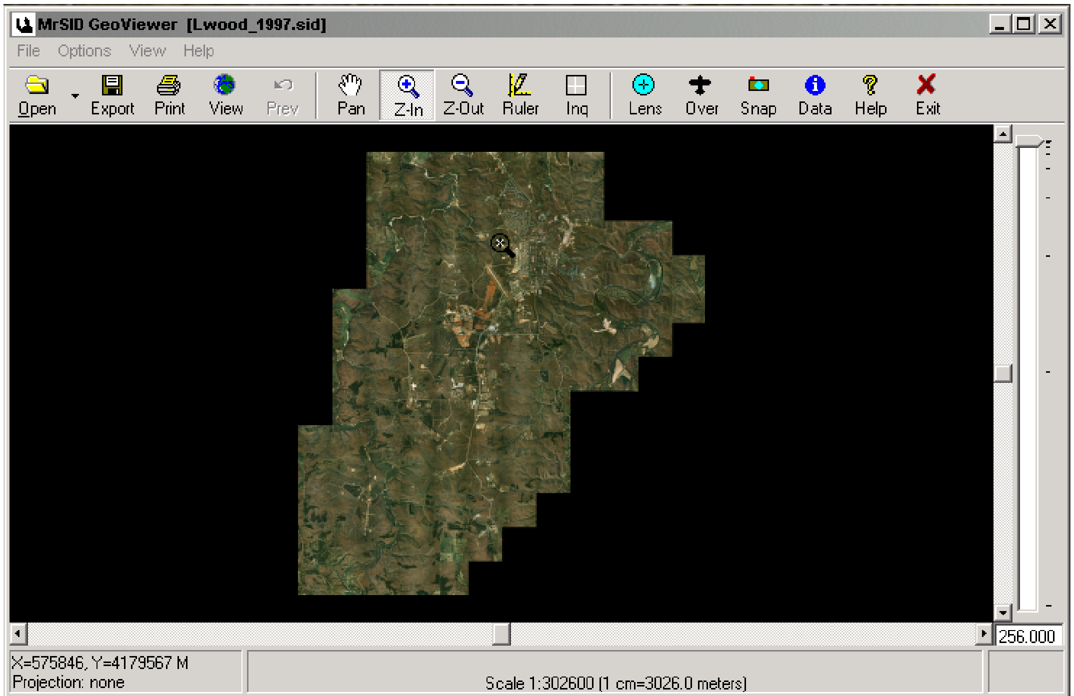
Many military Environmental and Department of Public Works offices will maintain their post image data in MrSID format. MrSID software is useful for small area coverage data storage.

MrSID data is distributed as a high compression (.SID) data file. The entire 10.6Gb FLW data set fits into a single 470Mb MrSID file. The free MrSID Viewer and GeoViewer use on-the-fly decompression to allow the user to view and extract segments of the image as geo-referenced Geotiff image files. These (.TIF) files with/without their associated (.TFW) world file contain the geo-coordinates necessary to use the image in industry standard geographic information systems software.

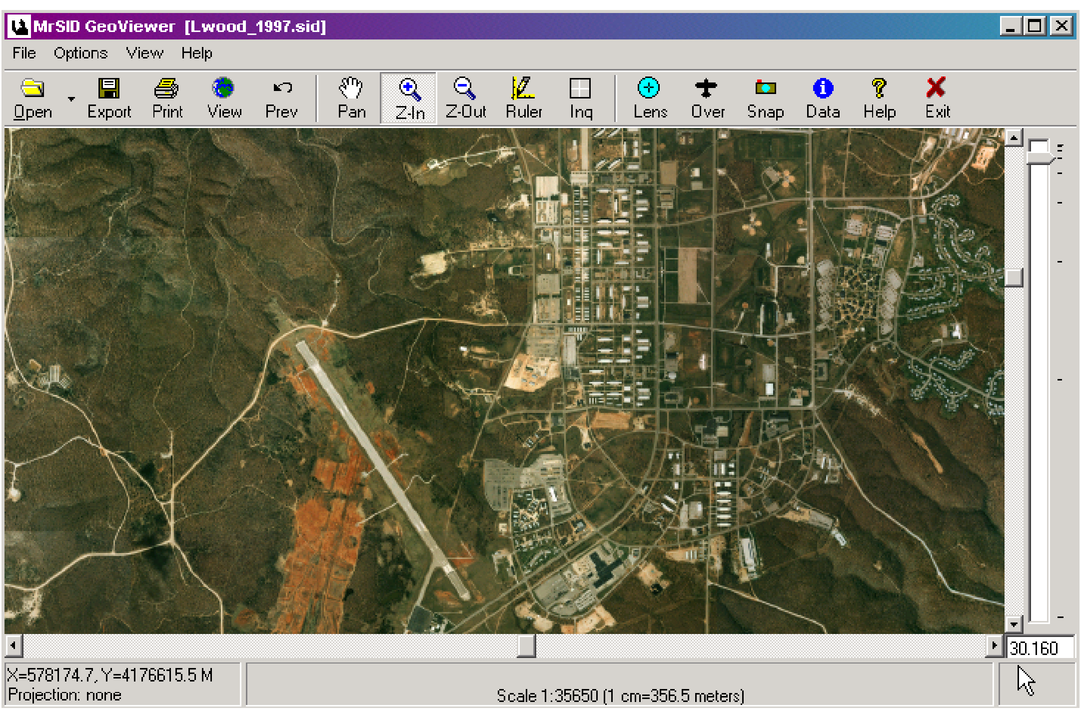


At the MrSid main menu select FILE and OPEN to bring up the OPEN window. Here you will select the desired .SID file for your area of interest. Once selected the image for the entire data set will be displayed in the viewer.

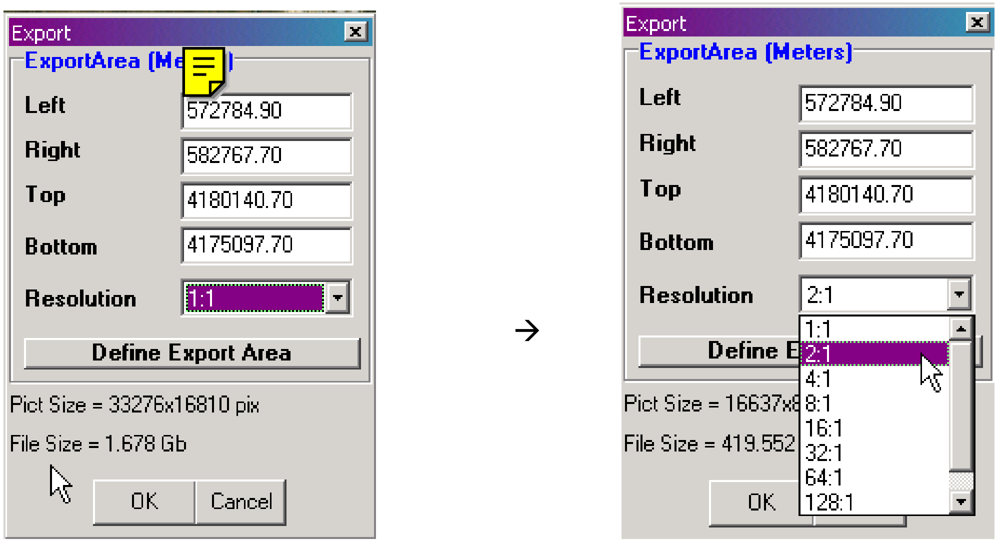
Using the <Zoom In> button → 



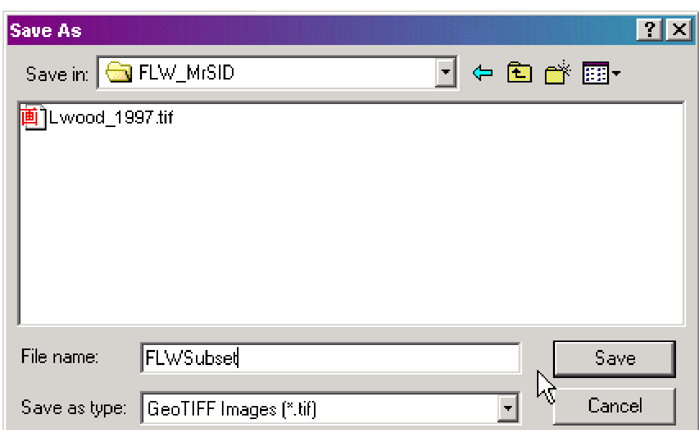
Click on the northwest corner of your AOI and drag to the southeast corner before releasing. Your selected area will be redisplayed on-the-fly.



Note the zoom ratio displayed at the lower right corner of your MrSID display. This is the ratio of pixels available in the image to those currently displayed. Once you have the area you wish to export displayed go to the main menu and select FILE and EXPORT. This will bring up the Export window.



Here you can correct the area you want to export via keyboard entry of corner coordinates, if necessary. Here you will select the Resolution of the exported data by selecting the thinning ratio from the list. NOTE that for the area we've selected a 1:1 export will create a 1.67Gb file while a 2:1 export will produce a 419Mb file. After you have identified the area and the resolution of the data to be exported click on the <OK> button.



This will bring up the Save As window where you will navigate to the location on your hard drive and type the name under which you wish to save the exported data.

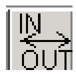
Once exported, the data may be used in MicroDEM as you would any other standard imagery file by selecting FILE / OPEN IMAGE at the main menu or by clicking on the <Open Image>

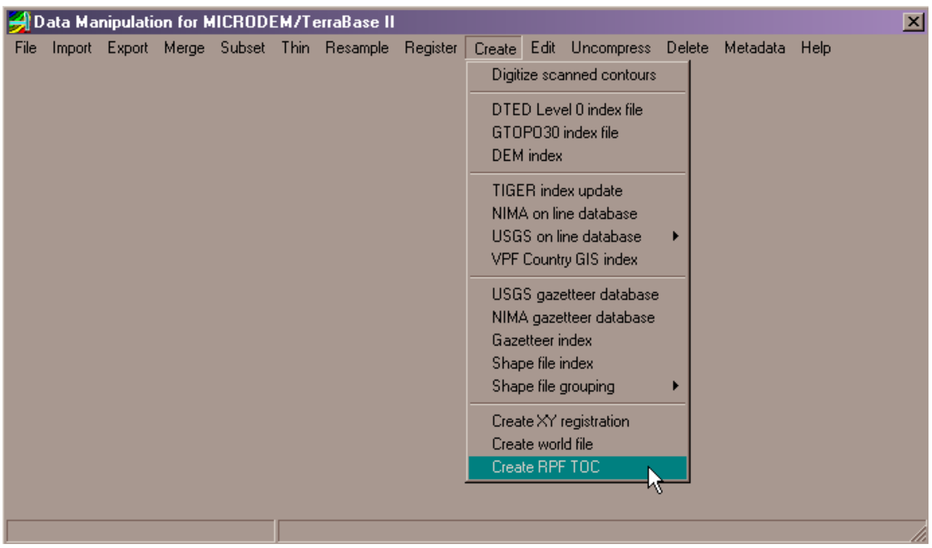
Button. →

Data Manipulation: Creating new NITF A.TOC Files

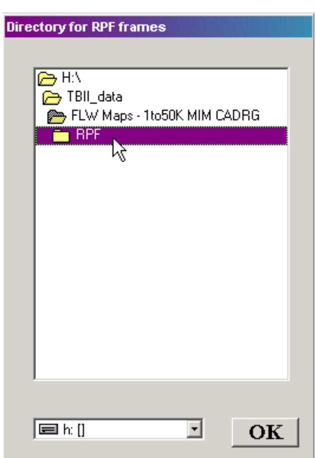
If you have received a NIMA CADRG or CIB CDROM with a bad A.TOC file, if you want to create a new data subset or if you wish to combine parts of two or more CDROMs with the same type of data and provide a new pseudo-A.TOC file to access the merged data sets you may do so as follows. The replacement file will be an A-TOC.DBF file and will function just like an A.TOC file.

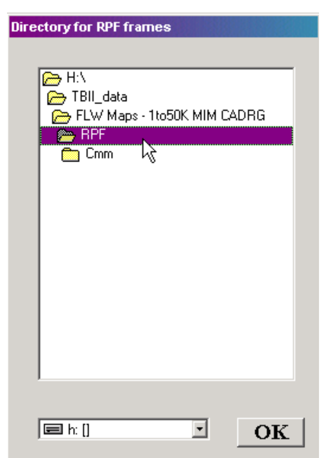
NOTE: You must have copied your RPF directory and all subdirectories to your hard drive to perform this function. After you have created your new A.TOC file you may cut the whole data set to a CDR.

Click on the <In-Out> button → 



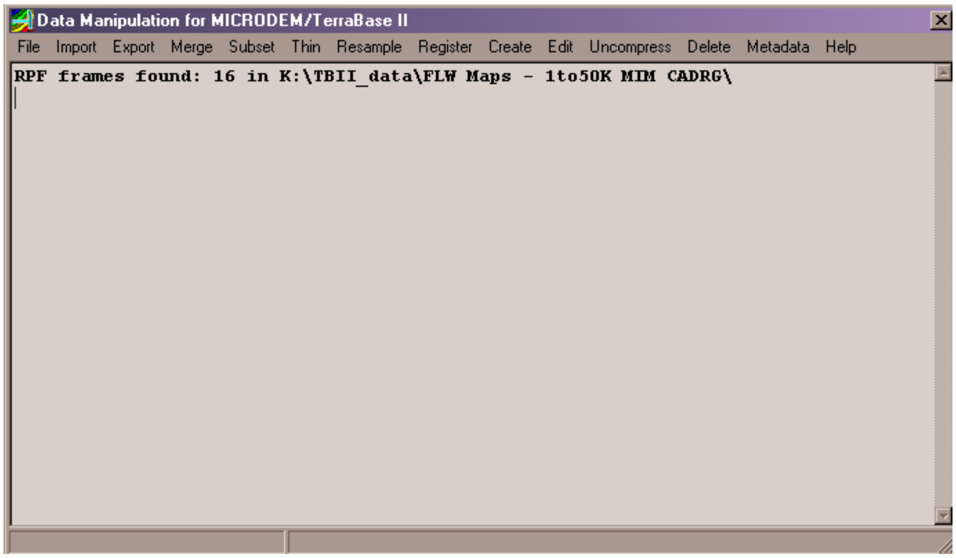
This will bring up the Data Manipulation for MICRODEM/TerraBase II window. Here you will select Create and Create RPF TOC from the menu.



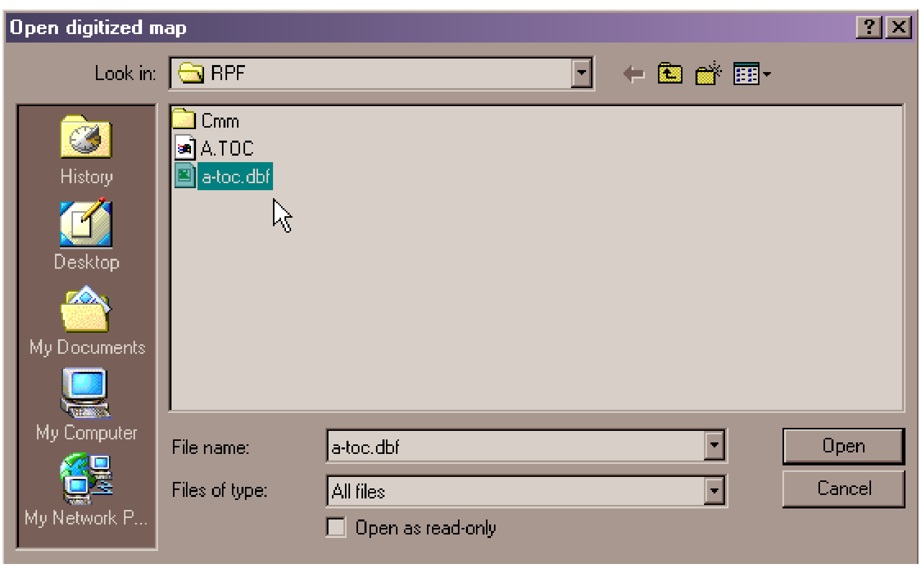


Correct Highlight of RPF directory. **Incorrect** selection of RPF directory.

This will bring up the Directory for RPF frames window where you will navigate to the location of the RPF directory under which you have placed all the subdirectories containing NITF data files. NOTE: Here you must highlight but NOT open the RPF directory.



If you have properly selected your RPF directory and if all the directories below it contain only the same type of NITF data (CADRG or CIB) then a message will appear indicating how many frame files were found. At this point your new A.TOC has been created.



If you have improperly laid out your directory structure or if you have misidentified the proper RPF directory you will receive the error message “No RPF frames found in …”.

NOTE: The new A-TOC.DBF file you’ve just created contains the path to your RPF frame files relative to the location of the RPF directory itself; therefore, all the data contained in the RPF directory is fully portable and may be passed to other users.

Loading and Using the USGS and NIMA Gazetteer

The Gazetteer allows you to search for a feature name and then to display the related elevation, imagery or map data covering your area of interest. NIMA data files must have been previously imported into the NIMA DataBase as described in **Chapter 2** Loading and Displaying Data with the NIMA Database..

USGS data files must have been previously imported into the USGS DataBase as described in **Chapter 2**.

You may download the individual state USGS Gazetteer files from:

http://geonames.usgs.gov

You may download the individual country NIMA Gazetteer files from:

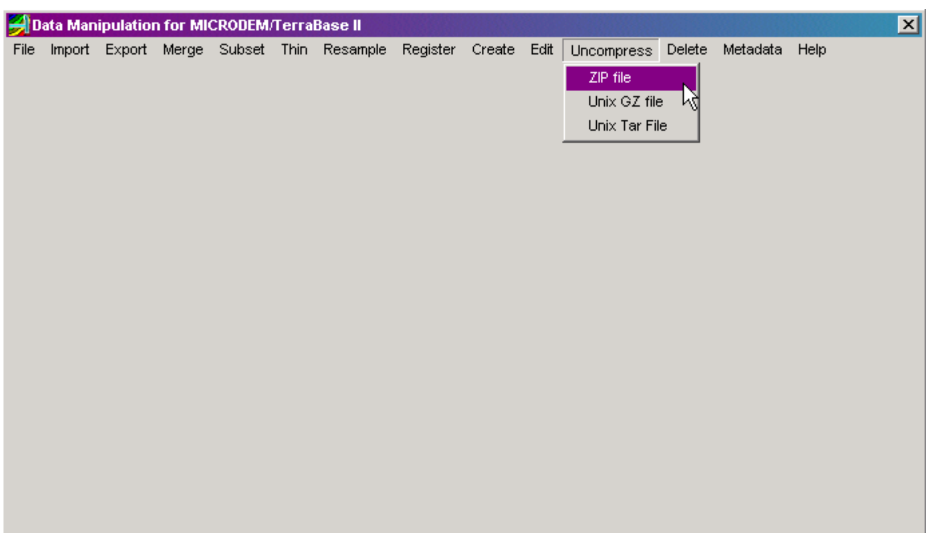
http://164.214.2.59/gns/html/index.html

NIMA DTED Level 1 CDROMs will usually have a Gazetteer subdirectory containing country specific files with .GAZ extensions.

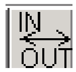
Download or copy the files to your ..\Mapdata\Gazetteer directory and uncompress them, if necessary, using Winzip or one of the decompression utilities available in MicroDEM in the Data Manipulation menu.

Click on the <In-Out> button → 

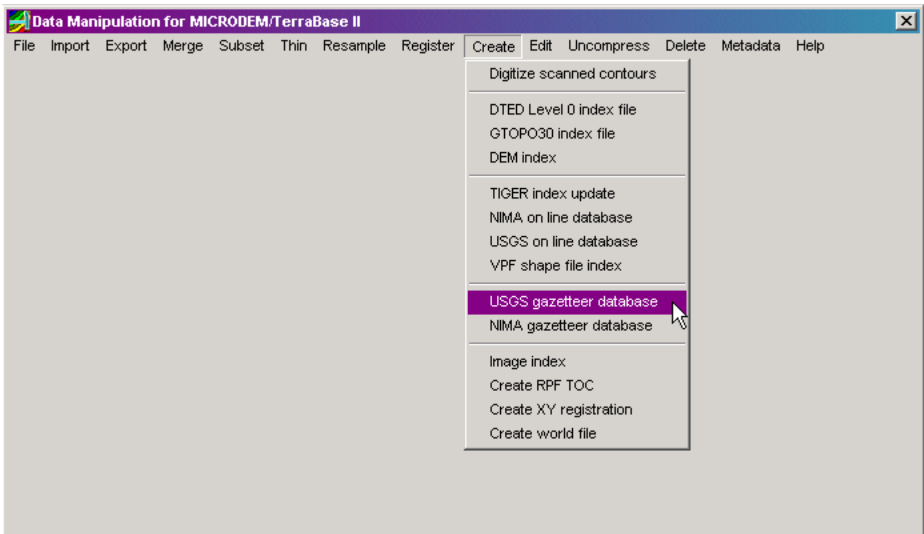
to bring up the data manipulation window.



NOTE: Once you have decompressed your USGS files they will have a _DECI file name ending but no extension. NIMA gazetteer files have a .TXT file extension.

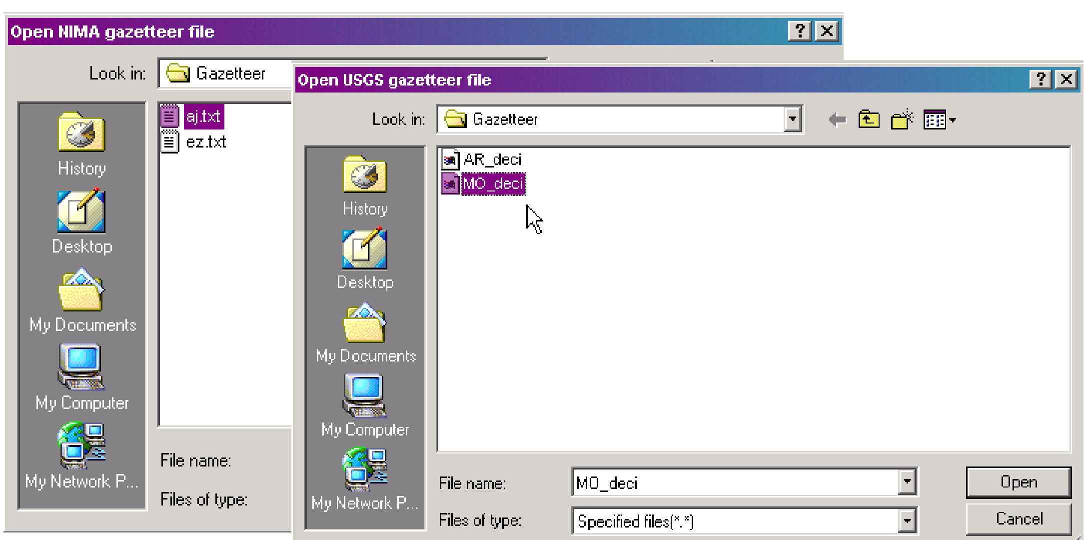
Click on the <In-Out> button → 

to bring up the Data Manipulation for MicroDEM/ TerraBase II window.



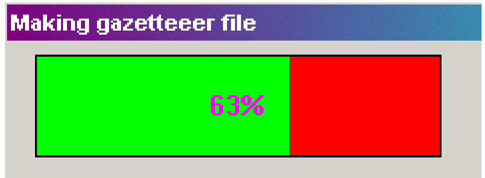
In order to use your newly downloaded gazetteer files you must update your gazetteer index files. Select NIMA gazetteer database to update your NIMA gazetteer. Your NIMA gazetteer files will have either a .TXT or .GAZ file extension. Select USGS gazetteer database to update your USGS gazetteer. Your USGS gazetteer files names will end in _DECI.

This will bring up either the Open NIMA gazetteer file window or the Open USGS gazetteer file window as shown below.

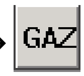


Select the desired country or state gazetteer file to load and search then click on the <Open> button → 

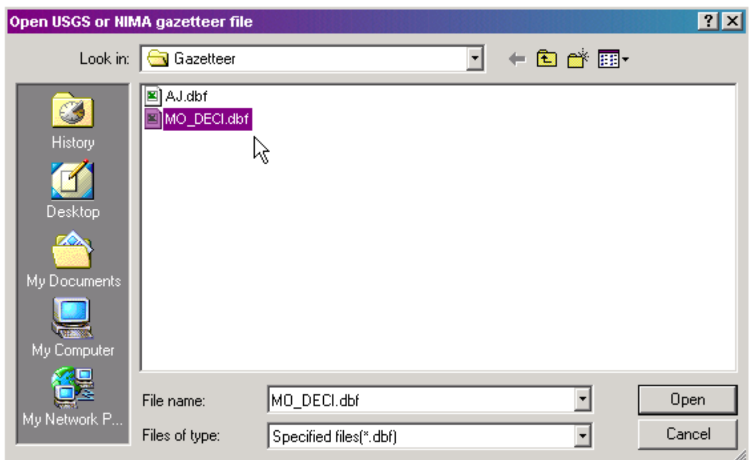
While the file is being process a Making gazetteer file progress bar will be displayed.



Close the Data Manipulation for MicroDEM/TerraBase II window by clicking on the <X> button located at the top right corner of the window.

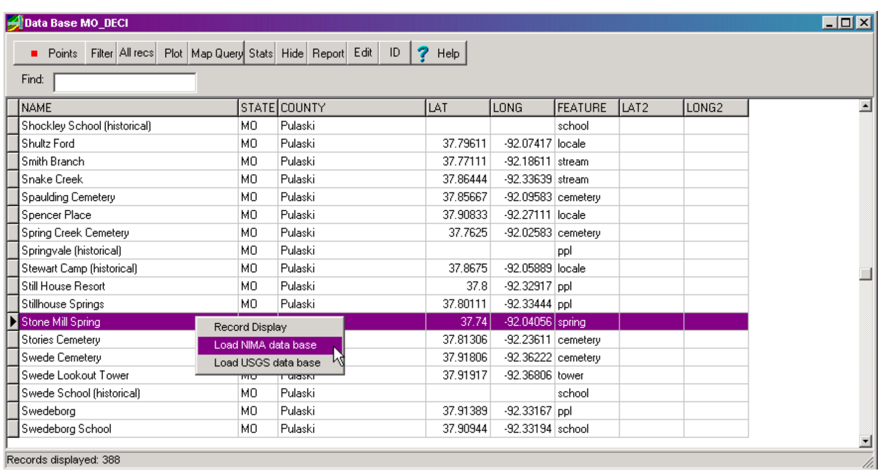
Access the Gazetteer by clicking on the <GAZ> button → 

to bring up the Open USGS or NIMA gazetteer file window.

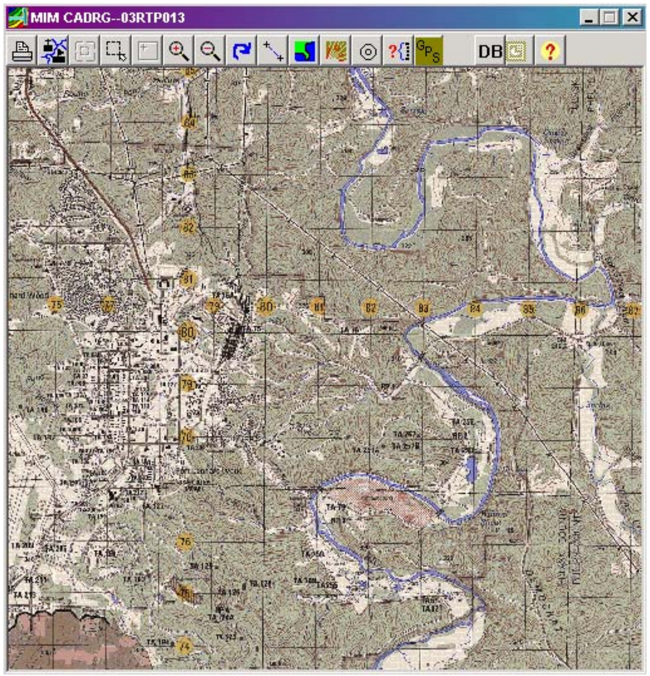


Select the desired country or state gazetteer file and click on the <Open> button → 

This will bring up the Data Base window for the file you have chosen as shown below.



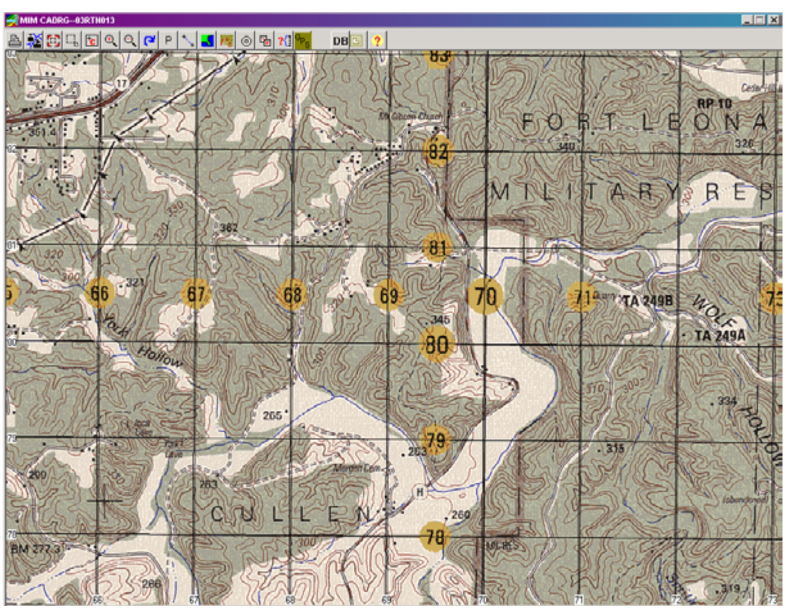
You may manually highlight the desired record, use the FILTER function as previously outlined, or start typing in the Find edit box to locate the name of the desired record you wish to display. Here I have selected the Stone Mill Spring trout fishing site on Fort Leonard Wood.
Double click on the desired record to bring up the popup menu and select either Load NIMA database or Load USGS database.



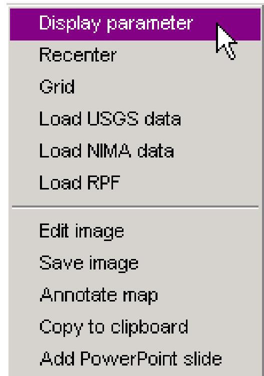
The elevation, imagery and map data which contain the area of interest for your Gazetteer database selection will be displayed. Remember that this data must have previously been imported into your NIMA DataBase and/or USGS DataBase.

2D Shaded Relief Maps

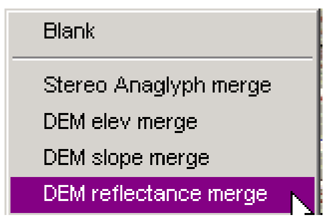
You may create a pseudo 3D merge of your elevation data shaded-relief and your map display to produce a Shaded Relief Map. First load the elevation data for your AOI. Next load the map data for your AOI.



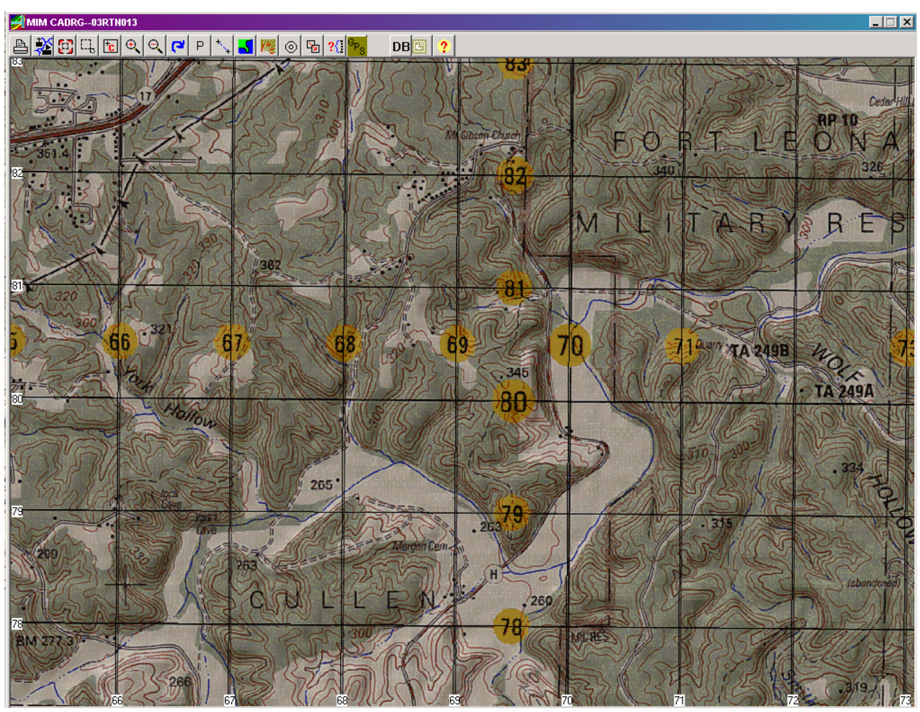
Right click on your map display to bring up the popup menu.



Select Display parameter from the menu to bring up the next popup menu.

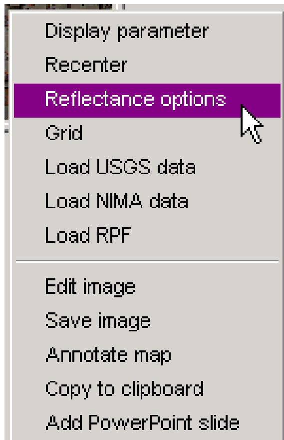


Select DEM reflectance merge from the popup menu.

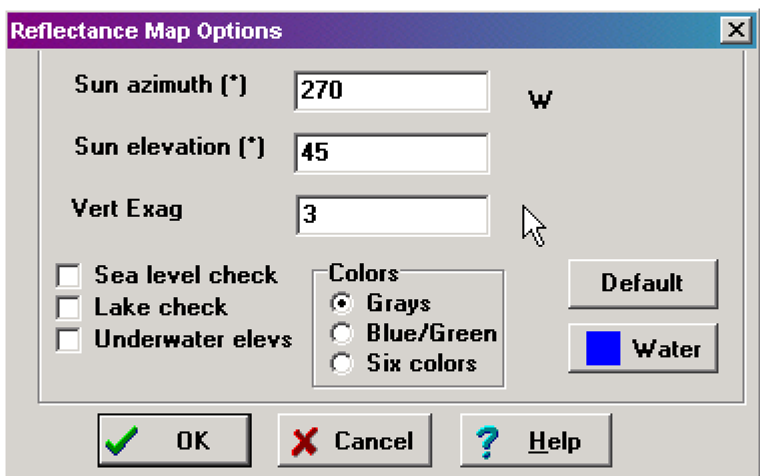


The resulting map display emphasizes the relief through shadows from apparent lighting.

You may alter the azimuth and elevation of the light source as well as the vertical exaggeration by right clicking on your map display to bring up the popup menu and selecting Reflectance Options.



This will bring up the Reflectance Map Options window.



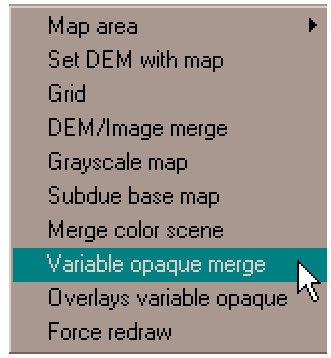
Once you have made your changes to the Sun azimuth, Sun elevation and/or Vert Exag data entry field click on the <OK> button to redraw your map display with these changes.

Variable Opacity Merge

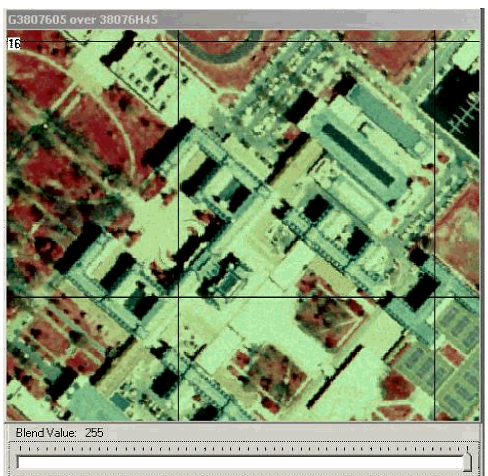
This function allows you to display two overlapping images and/or maps of the same area. The two images/maps must share the same projection (UTM or Lat/Long) and datum. As long as you stick to either USGS or NIMA data this should not be a problem. Mixing the two will lead to unpredictable results.

The displays are stacked and the slider bar control at the bottom of the display allows you to control the opacity of the upper layer so that you may view just the bottom layer, just the top layer or any intermediate step in between. **Note** this function is only available on systems running Windows 2000 or Windows XP operating systems.

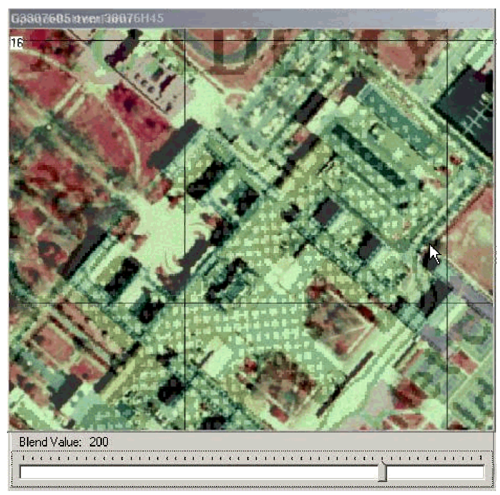
The first step is to individually display your two pieces of data for the same area. With the bottom image active go to the main menu and select MODIFY then select VARIABLE OPAQUE MERGE from the drop down menu →



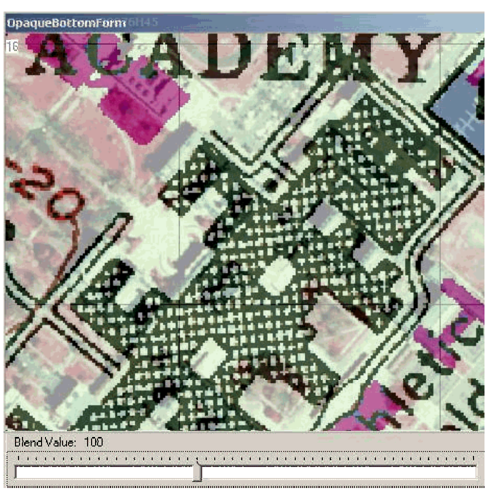
The merge will be created, using the bottom image for the size and coverage limits. Use the slide bar to change the opacity settings. See the images below for sample results.



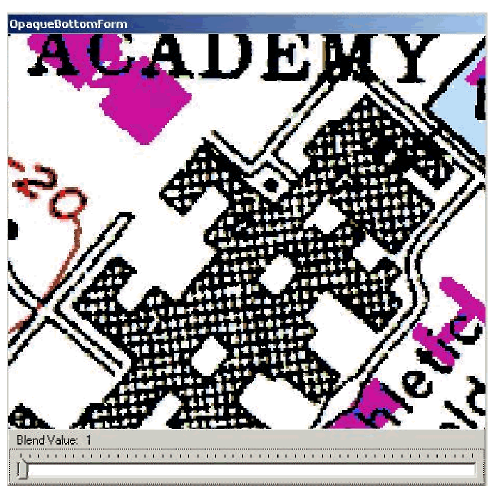
Top Image Opaque



Top Image Semi-Transparent



Top Image More-Transparent

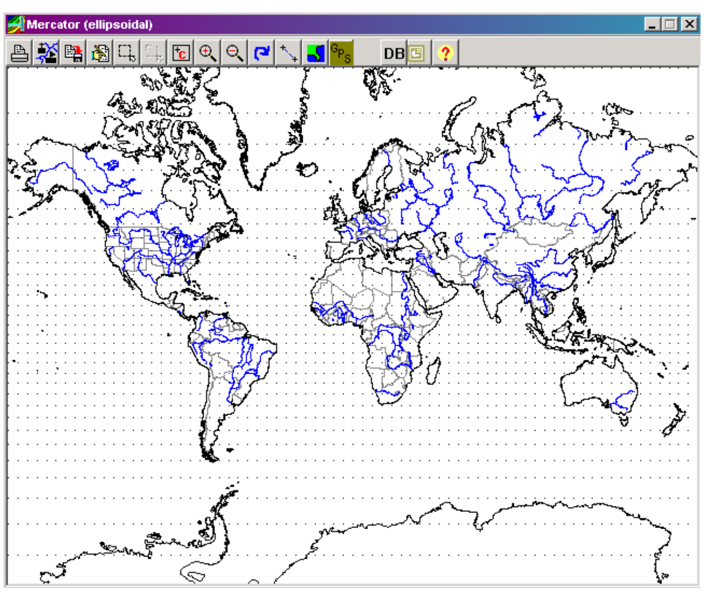


Bottom Image Only

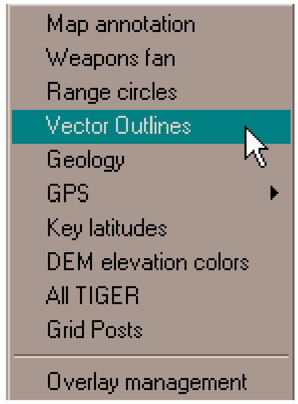
Chapter 9 Vector Data Operations

Load Single and Multiple ESRI Shape Files

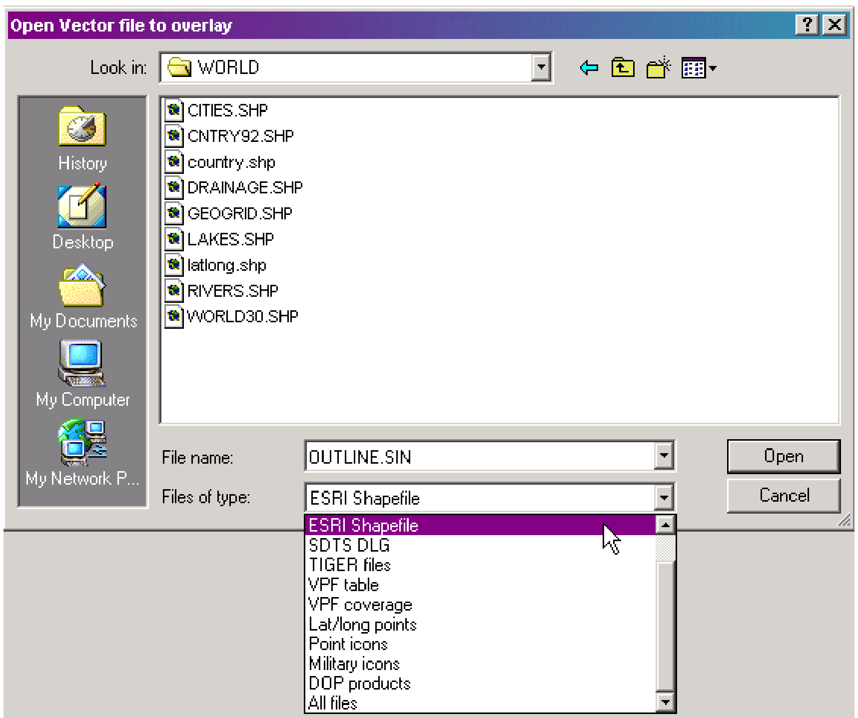
Shape files and their associated database attribute files are a standard non-proprietary GIS format widely used throughout the industry. Commercial ESRI shape files, shape files produced by other software packages such as ESRI ArcGIS and those created by MicroDEM may be displayed along with their (.dbf) attribute data in MicroDEM. Shape files may be displayed over the World Vector Map, over a blank vector background or over any elevation, imagery or map data. Once you have your background display opened the remainder of the procedure is the same.



At the main menu select OVERLAY and VECTOR OUTLINES →

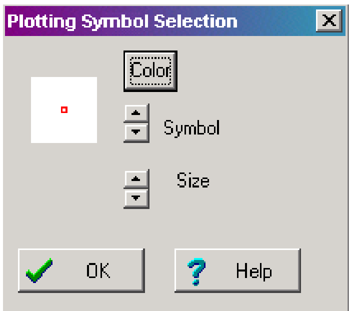


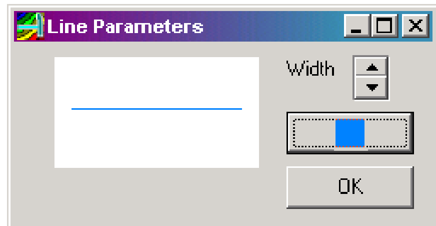
This will bring up the Open Vector File to overlay window.

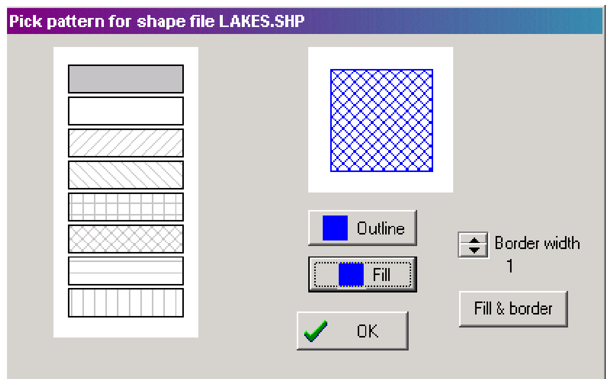


Navigate to the location of your (.SHP) and (.DBF) shape files. Select either ESRI Shapefile or All files from the Files of type: list. If you have selected All files you may see the same file name with as many as seven different files extensions: .avl, .dbf, .prj, .sbn, .shp and .shx. The only important files for use in MicroDEM are the .shx, .shp, and .dbf types. Select the desired .SHP file to be displayed and click on the <OPEN> button. **NOTE:** Entire coverages for Shape files created from VPF data in MicroDEM may be loaded by selecting their vpf_index.dbf file located with the coverage under the ..\MapData\NimaData\VPF-shapes directory.

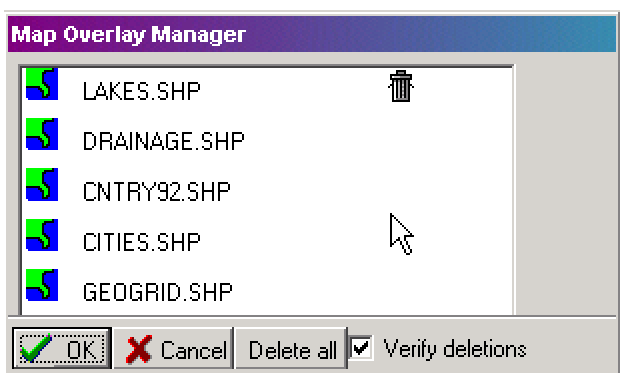
Note You may load the individual point, line or area shape files or you may batch load multiple files by selecting the files as a group, highlighting all desired files from the folder. Depending on the type of data file you've selected**:** point, line or area; you will get one of the following windows in which you will select the pattern, symbol, line weight and/or color for your selected feature. If you select more than one file you will have to select the desired color, line weight, pattern or symbol for each file.







If you manage to obscure an earlier point or line file with an area feature you can manually resort the order of data in your overlay stack by accessing the Map Overlay Manager. At the main menu select OVERLAY and OVERLAY MANAGER to bring up the Map Overlay Manager window.

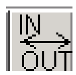


Simply click on the overlay you wish to move and drag it to a new position in the stack. To delete a single overlay simply click on it and drag it to the trash can at the upper right corner of the manager window.

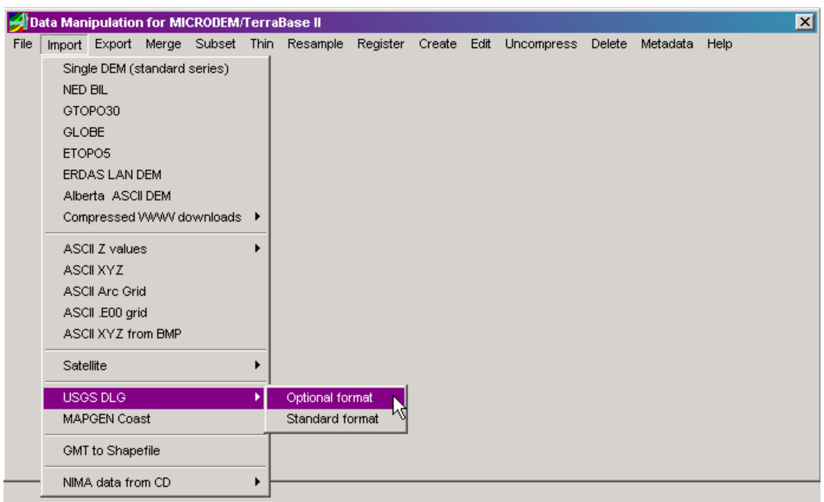
NOTE: If you only have a single overlay you will not get the pop-up Map Overlay Manager, you will simply be asked if you wish to delete the single overlay.

Import and Display USGS Digital Line Graphics (DLG) Files

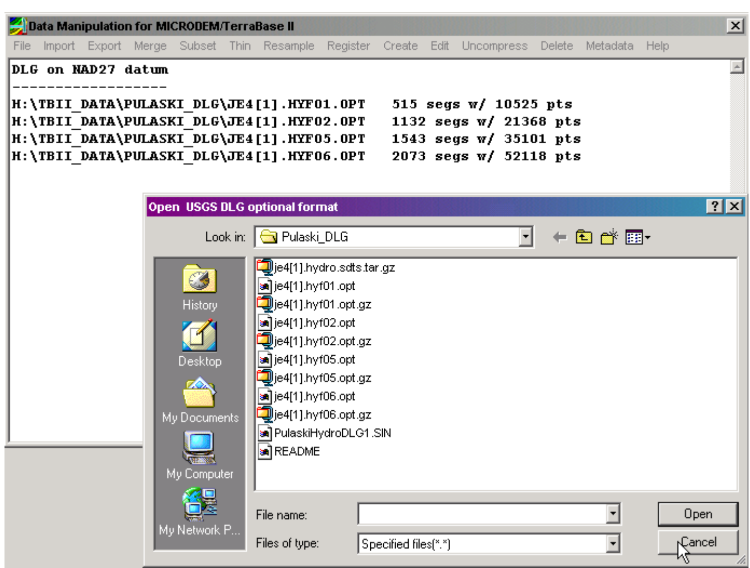
Digital Line Graphics (DLG) files are digital vector data derived from photographic and cartographic sources. Base feature categories include transportation, hydrography and boundaries. DLG data is available in a variety of scales 1:24k, (1:25k, 1:63k for Alaska), 1:100k and 1:2Million. DLG data may be purchased from the U.S. Geological Survey and may often be found for free download at many local universities. DLGs are available in Graphic, Optional, Standard and Spatial Data Transfer Standard (SDTS) formats. MicroDEM is capable of importing both Optional and Standard formats. When downloaded the files are often compressed in a (.GZ) file so you'll first need to use WinZip or the decompression utilities available under MicroDEM's Data Manipulation menu to extract the (.OPT) data file.

Click on the <In-Out> button → 

to bring up the Data Manipulation for MicroDEM/TerraBase II window.



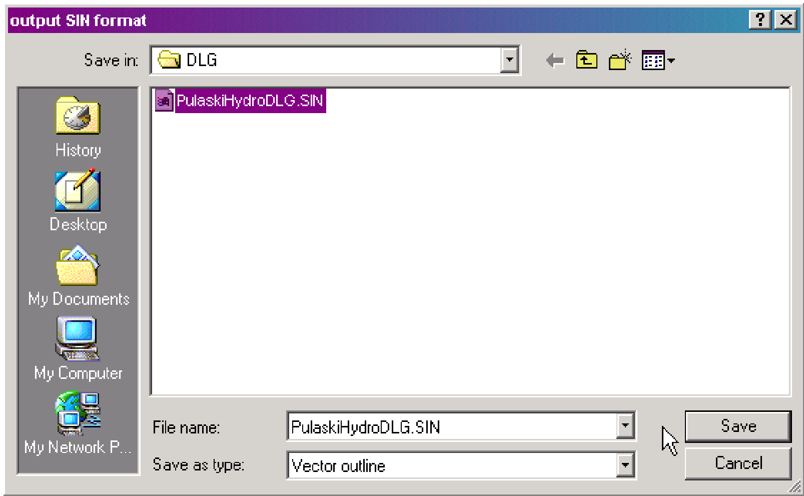
Select the IMPORT/USGS DLS/OPTIONAL FORMAT from the menus. This will bring up the Open USGS DLG Optional format window .



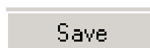
Here you will navigate to the location and select your (.OPT) DLG file. You may have several contiguous data files numbered sequentially as shown above. Select the first file and

click on the <Open> button → 

to bring up the Output SIN format window.



Navigate to the desired output storage location and type a file name to save your imported data to

then click on the <Save> button → 

This will bring up the Open USGS DLG Optional format window again. Notice that the path, file name, number of segments and number of points for each of your selections is listed in the Data Manipulation for MicroDEM/TerraBase II window.

Non-contiguous files, and files for other features should each be imported separately. Contiguous files for the same feature should be loaded together.

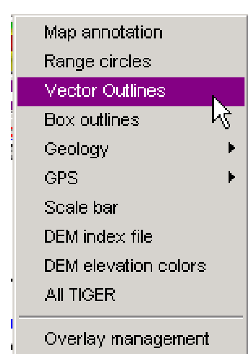
Continue to select the contiguous data files for your feature until you are done then click on the

<Cancel> button → 

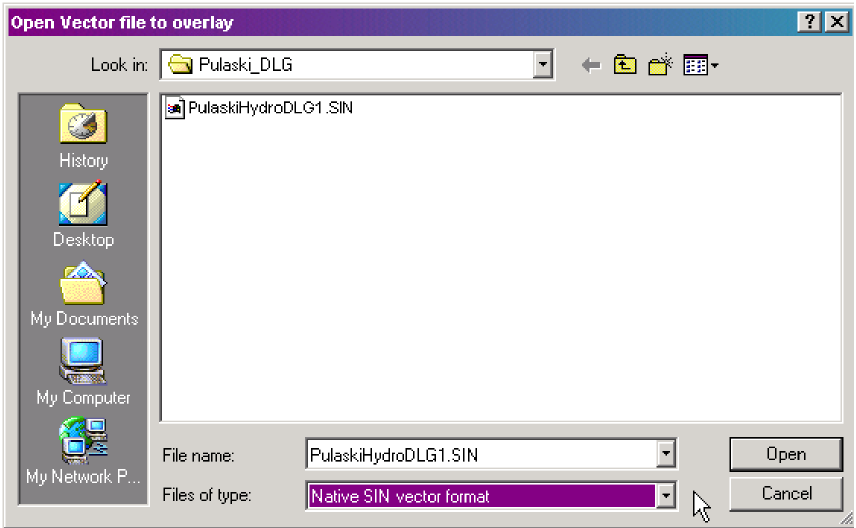
You have successfully imported your data and may now display it. The method for importing Standard format DLG data is the same as that outlined for Optional format data.

Imported DLG, now (.SIN) files may be displayed over the World Vector Map, over a blank vector background, over a blank raster background or over any elevation, imagery or map data. Once you have your background display opened the remainder of the procedure is the same.

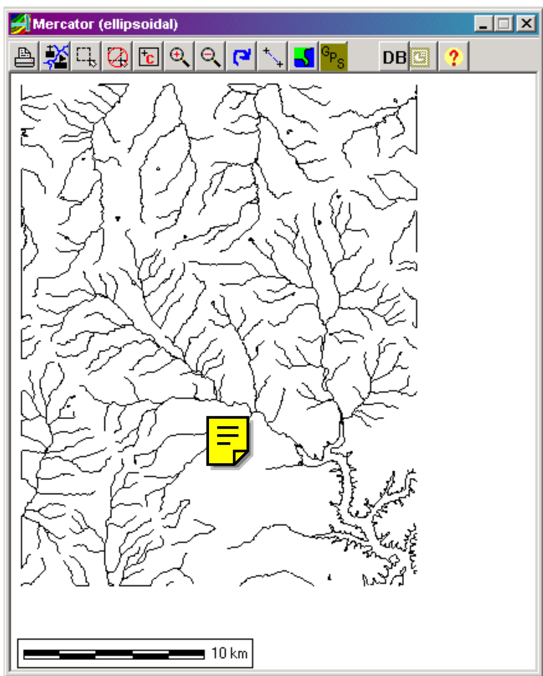
At the main menu select OVERLAY and VECTOR OUTLINES.



This will bring up the Open Vector File to overlay window.



Here you will navigate to the location of your (.SIN) imported DLG files. Be sure and select either Native SIN vector format or All files from the Files of type: list.



If you manage to obscure an earlier point or line file with an area feature you can manually resort the order of data in your overlay stack by accessing the Map Overlay Manager. At the main menu select OVERLAY and OVERLAY MANAGER to bring up the Map Overlay Manager window.

Simply click on the overlay you wish to move and drag it to a new position in the stack. To delete a single overlay simply click on it and drag it to the trash can at the upper right corner of the manager window.

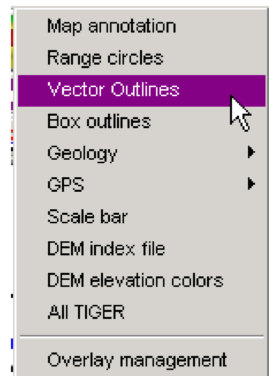
NOTE: If you only have a single overlay you will not get the pop-up Map Overlay Manager, you will simply be asked if you wish to delete the single overlay.

US Census Bureau TIGER Files

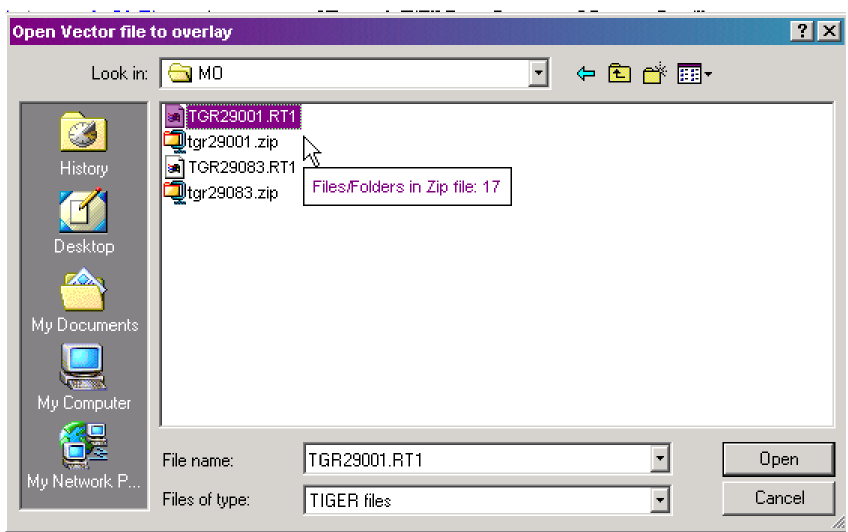
TIGER data is created by the U.S. Census bureau. MicroDEM is capable of displaying the data for the census years 1990, 1997 and 1999.

TIGER data may be displayed over the World Vector Map, over a blank vector background or over any elevation, imagery or map data. Once you have your background display opened the remainder of the procedure is the same.

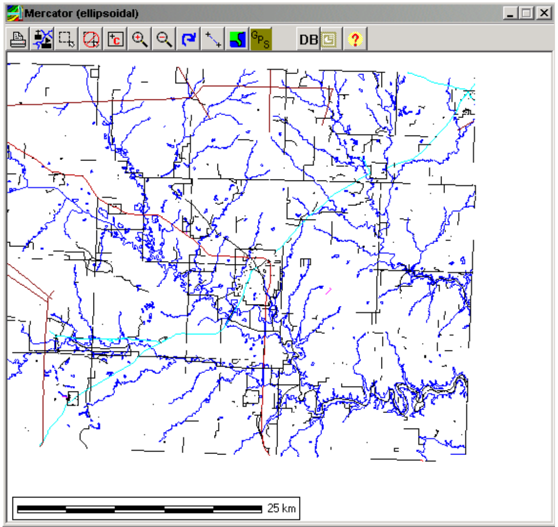
At the main menu select OVERLAY and VECTOR OUTLINES.

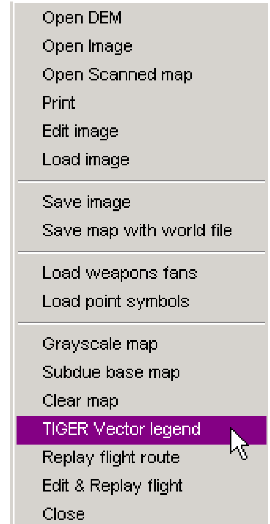


This will bring up the Open Vector File to overlay window.

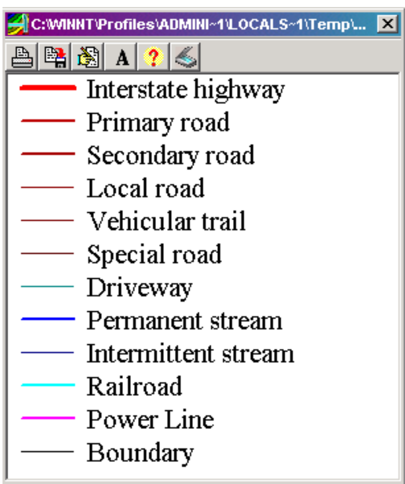


Here you will navigate to the location of your TIGER files. Be sure and select either TIGER Files or All files from the Files of type: list. Select the desired (.RT1) or (.ZIP) file to be displayed and click on the <OPEN> button.

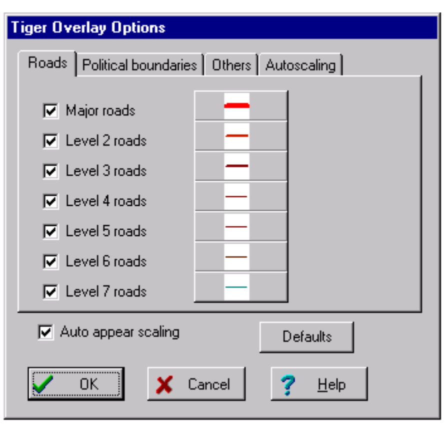


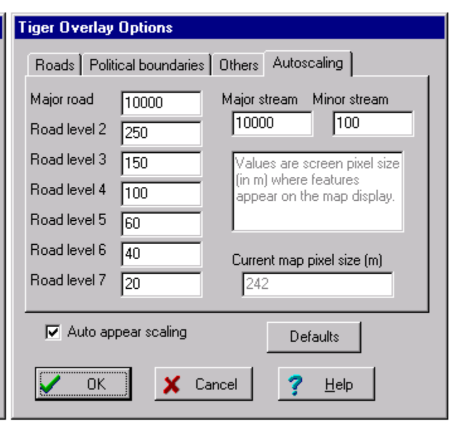


The TIGER data will be displayed over your background map, if any. To bring up the TIGER Legend go to the MicroDEM main menu and select FILE / TIGER VECTOR LEGEND.



If you wish to change the default plotting options for your data simply right click on the display. The will bring up the Tiger Overlay Options window.

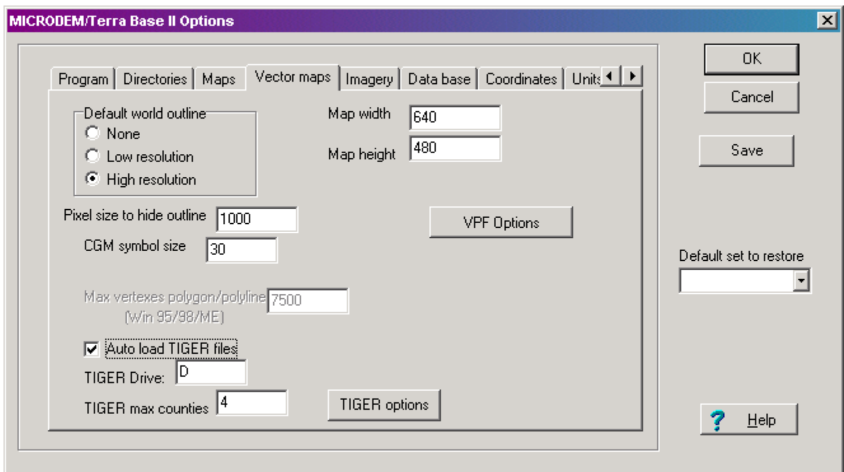




This window allows you to modify the look of your TIGER data. Separate tabs allow you to alter the display of the roads, political boundaries, other features, and the auto-scaling.

The Auto appear scaling checkbox uses "smart" logic to scale the map as you zoom in and out by removing smaller features as the map scale becomes smaller. When auto-scaling is on, roads and streams only appear if the pixel size on the map (in meters) is smaller than the selected threshhold value.

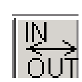
The TIGER database and auto-loading of TIGER data may be accessed by going to the main

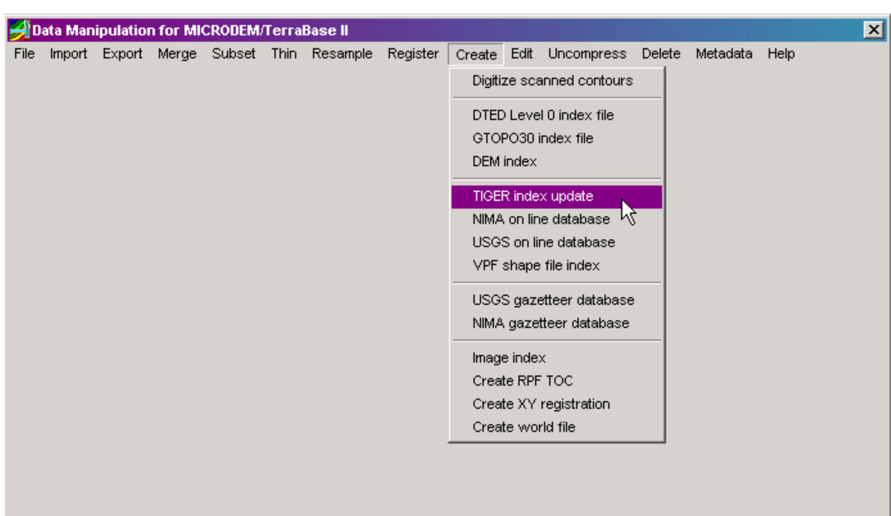


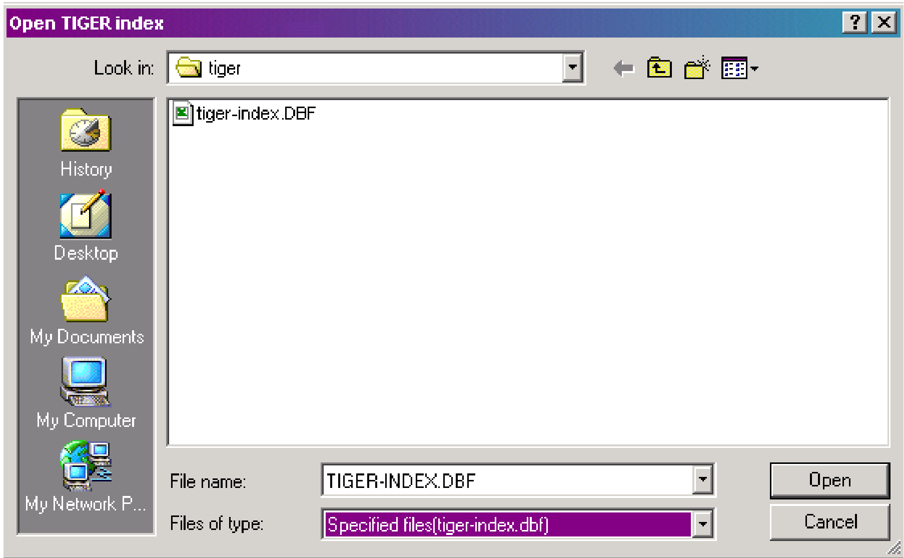
Menu. Select OPTIONS and then select the Vector Maps tab. Here you can set your TIGER data to be automatically loaded when you display other elevation, imagery or map data for the same area by checking the Auto Load TIGER files box.

You may load data into your TIGER database by copying the specific tgrXXXXX.zip files to your ..\Mapdata\Tiger directory. You will need the index for your data to determine the numerical identification for your desired area of interest.

The TIGER index is not part of the standard MICRODEM installation. You can get it from the MICRODEM home page at USNA.

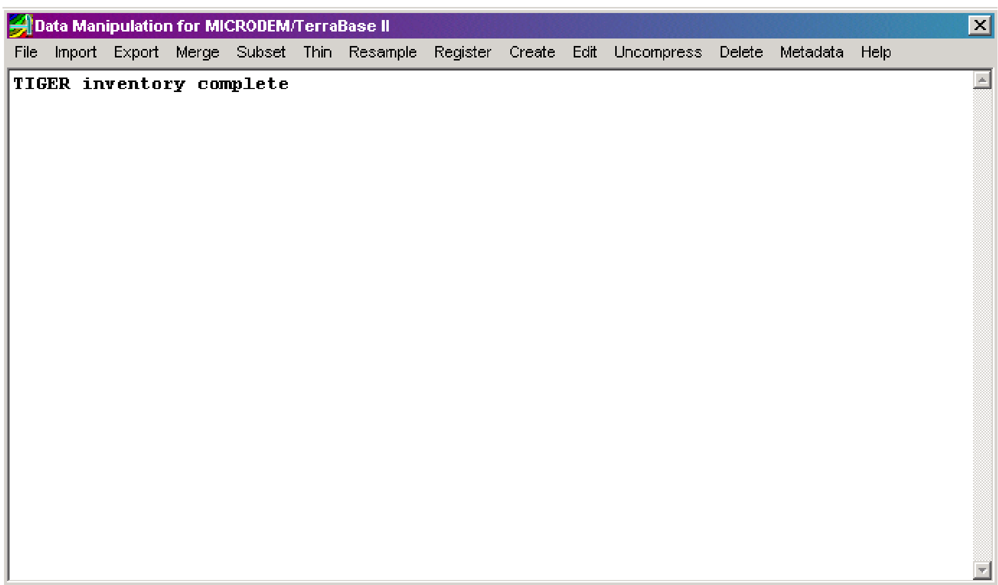
You must update your TIGER Index by clicking on the <In-Out> button →  to bring up the Data Manipulation for MicroDEM/TerraBase II window.





Select the tiger-index.dbf file and click on the <Open> button → 

to update.



The Data Manipulation for MicroDEM/TerraBase II window will notify you when your index has been successfully updated.

Display of NIMA Vector Product Format (VPF) Data

VPF data may be displayed over the World Vector Map, over a blank vector background, blank raster background or over any elevation, imagery or map data.

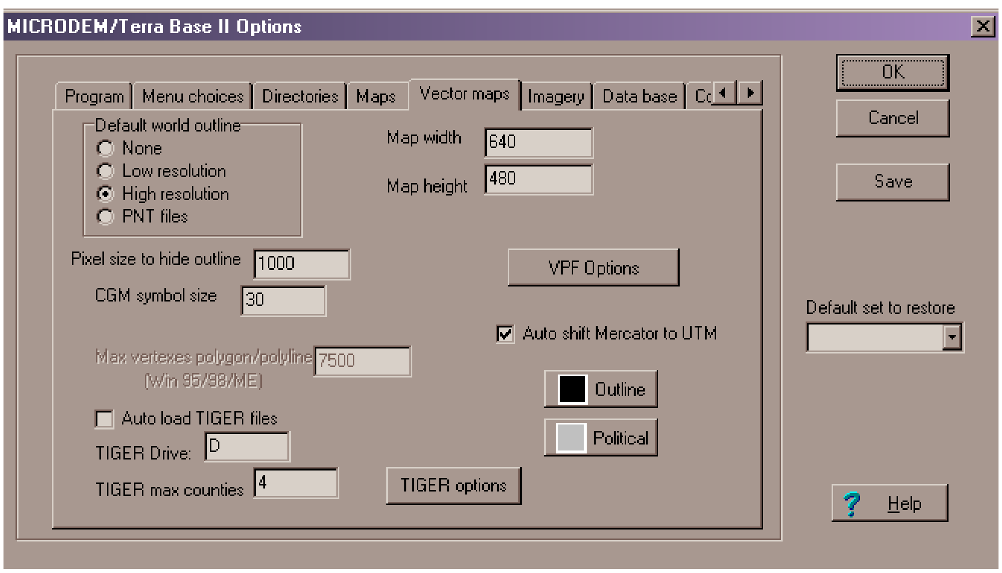
VPF data may be displayed as individual features such as trees and channels via their specific (.PFT),(.LFT) and (.AFT) feature table files or as a complete map set via the (.CAT) catalog file.

VPF may be displayed using simple map symbology. The advantage of this method is relative speed of display.

VPF may be displayed using NIMA GeoSym Prototype map symbology. The advantage of this method is its display of map features using the NIMA map symbols. Be warned this is a VERY slow process.

VPF may be converted to shape files and associated database attribute files. Once converted the attribute data may be filtered, searched and queried. The resulting records may be graphically displayed.

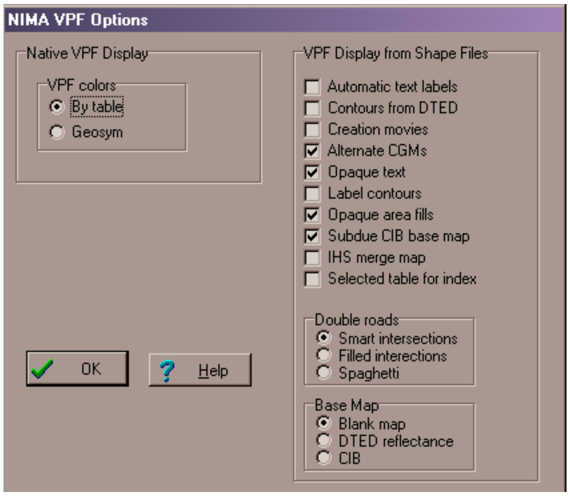
The detailed options for display of VPF are selectable in the MicroDEM/Terrabase II Options window.



Select Options from the main menu then select the Vector Maps tab. Click on the <VPF Options>

button → 

This will bring up the NIMA VPF Options window.



Here you can elect to display the VPF data using fast, simple symbology by selecting the By table radio button under VPF colors. You may display the data using the slower NIMA Geosym symbology by selecting the Geosym radio button.

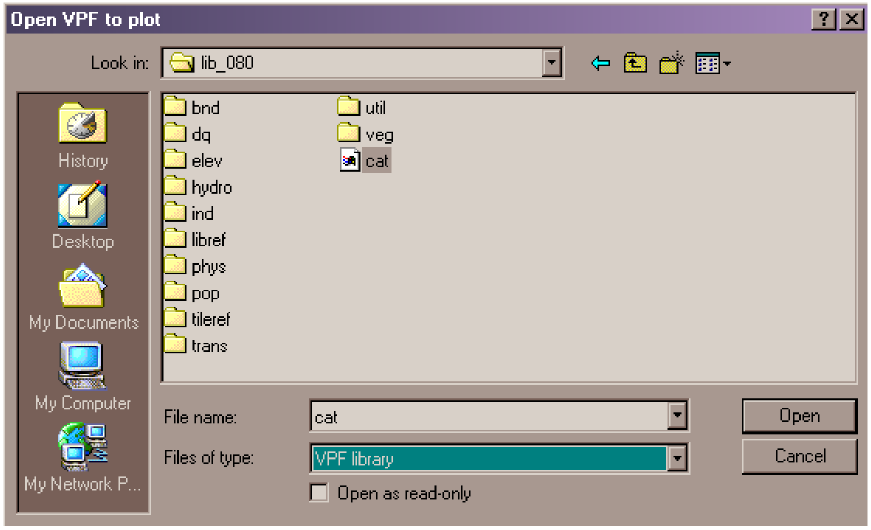
If you select the Blank map radio button from the Base Map section your data will be displayed in a new window. If you select the DTED reflections radio button your VPF data will be displayed over a shaded relief map background. If you select the CIB radio button your data will be displayed over Controlled Image Base background. **NOTE:** You must have the DTED or CIB data for your area of operations pre-imported in your NIMA Database for these last two options to work. See **Chapter 2** Loading and Displaying Data with the NIMA Database.

Quick Display of VPF Map Data

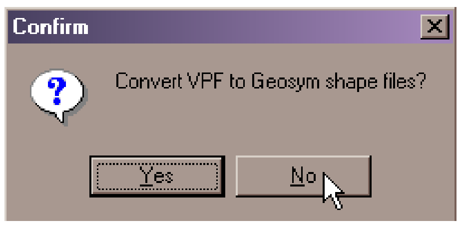
You may quickly display your VPF data with simple symbology by selecting OPTIONS from the main menu, clicking on the Vector Maps tab, clicking on the <VPF Options> button, selecting the By table radio button under VPF colors and selecting Blank map under Base Map. These are the default settings if you selected TerraBase from the Default set to store list, see **Chapter 1** Setting Options.

To display the VPF data in a new map window click on the <VPF> button → 

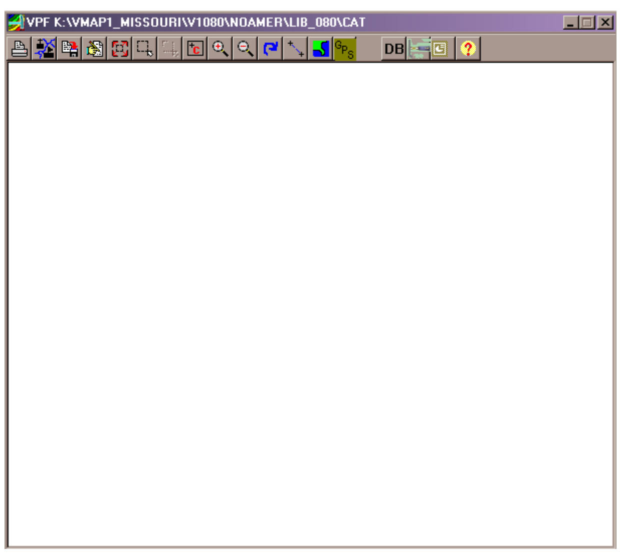
Select VPF Keyboard Selection from the VPF pull down then manually navigate to the data on your system Open VPF to Plot dialog.



Here you can set Files of Type to VPF Library and then select the .CAT file to display your whole data set.

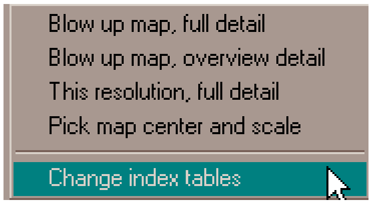


A popup Confirm dialog window will ask whether you wish to convert the VPF data to shape files. Click the <NO> button since we want to quickly display the VPF data as-is without the extra delay of converting the data to shapefiles.



Selected Index features will now be displayed for your data set. If this is the first time you have displayed VPF data your index map display may be blank as shown here.

Next you will see a popup menu with choices on blowing up a small portion of the map, loading the whole map or changing the index feature. Select Change Index Tables from the menu.



This will allow you to change the Index Tables. These are the first features to be drawn from your data set. These allow you to determine the extent of your data and allow you to define a subset to be plotted if necessary. This speeds the initial selection by not requiring the entire data set to be loaded each time.

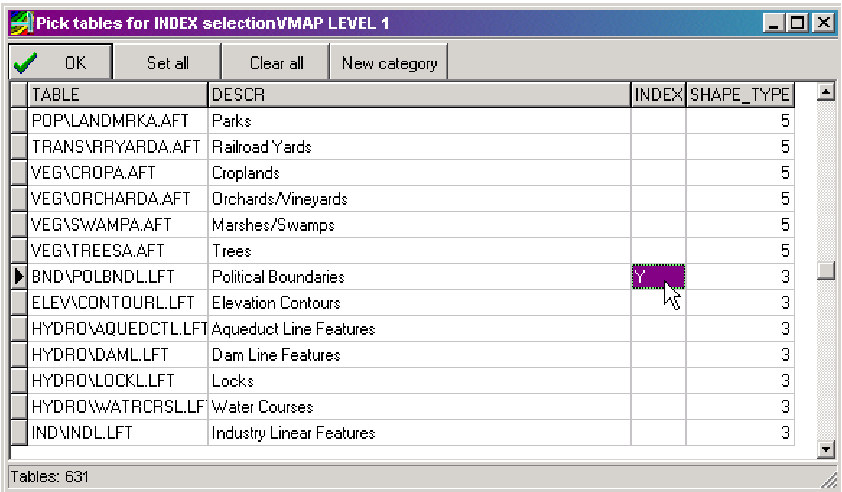
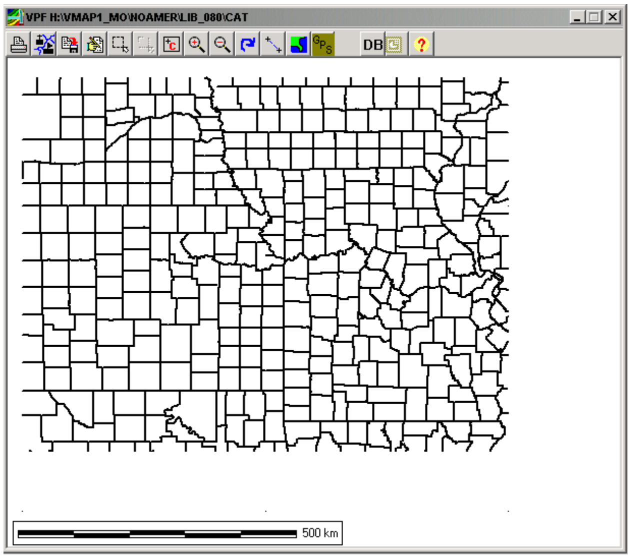


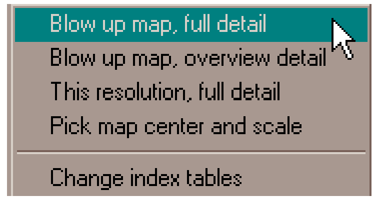
TABLE	DESCR	INDEX	SHAPE_TYPE
POP\LANDMRKA.AFT	Parks		5
TRANS\RRYARDA.AFT	Railroad Yards		5
VEG\CROPA.AFT	Croplands		5
VEG\ORCHARDA.AFT	Orchards/Vineyards		5
VEG\SWAMPA.AFT	Marshes/Swamps		5
VEG\TREESA.AFT	Trees		5
BND\POLBNDL.LFT	Political Boundaries	Y	3
ELEV\CONTOURL.LFT	Elevation Contours		3
HYDRO\AQUEDCTL.LFT	Aqueduct Line Features		3
HYDRO\DAML.LFT	Dam Line Features		3
HYDRO\LOCKL.LFT	Locks		3
HYDRO\WATRCRSL.LF	Water Courses		3
IND\INDL.LFT	Industry Linear Features		3

Using your Index Tables double click in the INDEX column to mark the selected feature with/without a ‘Y’ to display the feature initially. Once selected you will use the index table feature to further define the area you wish to display fully.

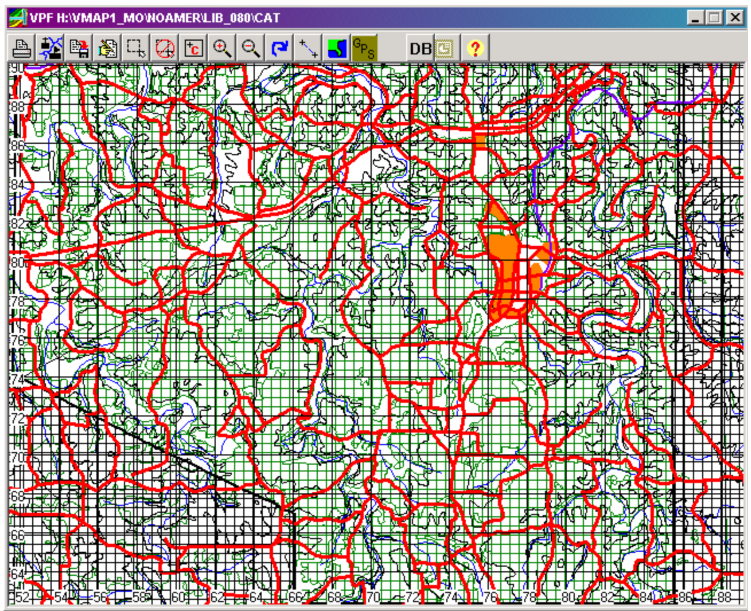


Here we have chosen Political Boundaries as our index feature. This is the only feature initially displayed.

You will again be offered the VPF Pop-up menu.

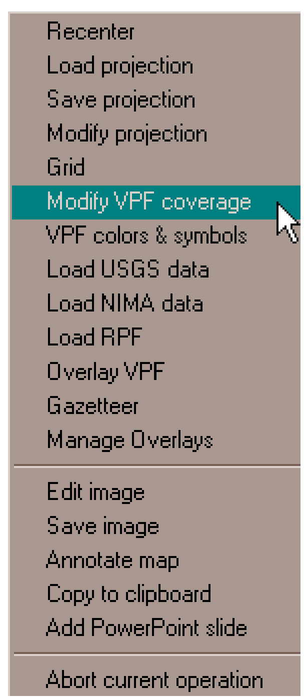


To load the entire data-set select This resolution, full detail from the list. Be aware that this process could take a VERY long time if you have a large data set such as this Vmap1. To load a selected area of the data select Blow up map, full detail from the list. Click on the North West corner of your area of interest, hold the mouse button down and drag to the South East corner and release. The individual layers/themes will be displayed in the order defined by the specification for that data set.

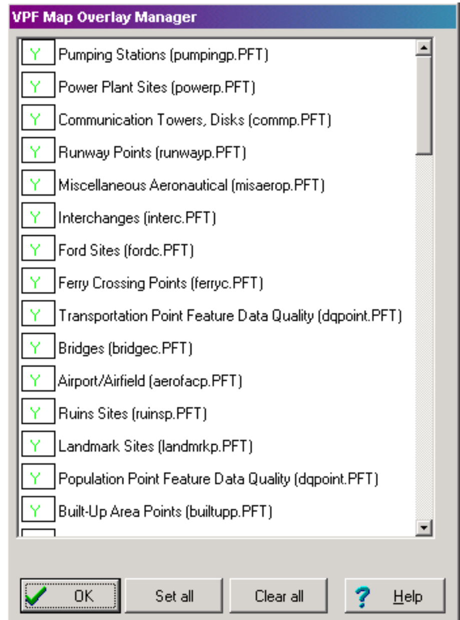


Here I have selected to display only the southern portion of Pulaski County.

You may adjust what specific features, out of the entire data set, are displayed by right clicking on your display and selecting Modify VPF Coverage from the popup menu →



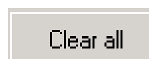
This will bring up the VPF Map Overlay Manager.



Here can select and deselect what specific features you wish to display by double clicking in each box to toggle back and forth between Y and N. You may also select all features by clicking

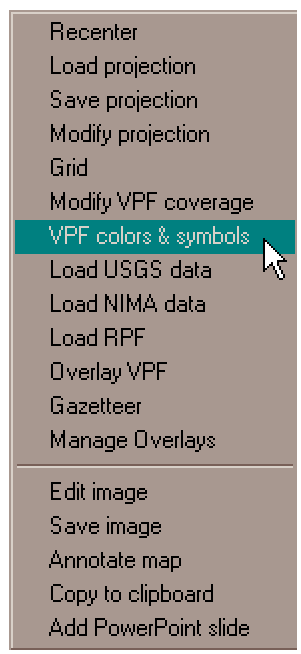
on the <Set All> button →

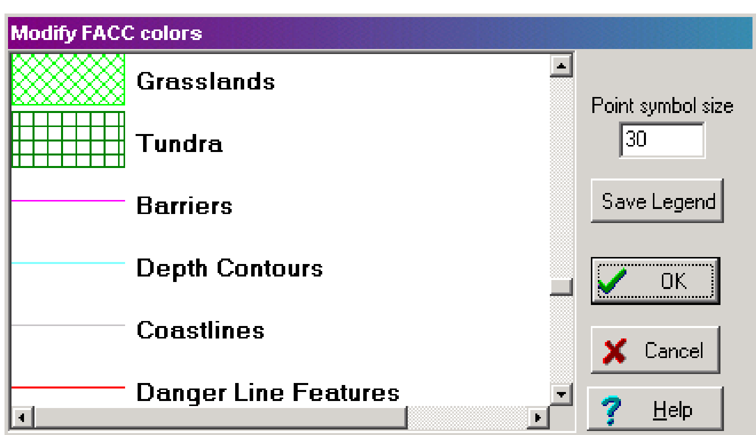
or deselect all features by clicking on the <Clear All> button.→



To redraw your display with the selected set of features click on the <OK> button. →

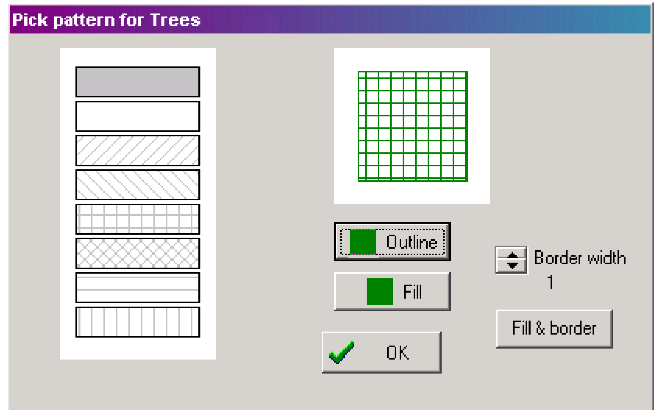
To change the display color or pattern for any given feature right click on your display to bring up the popup menu and select VPF Colors and Symbols from the list →

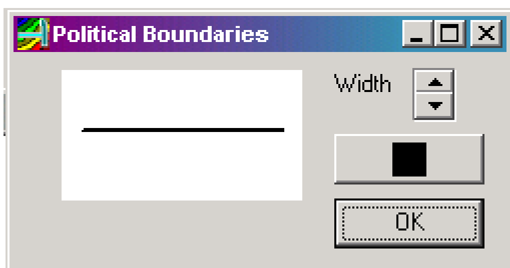


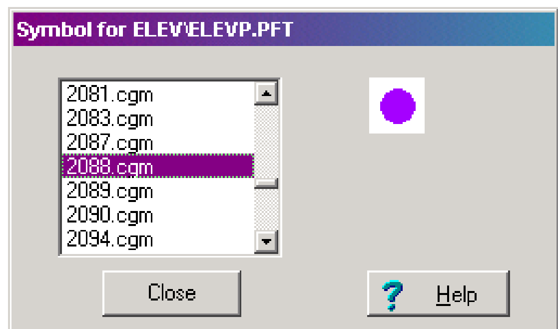


This will bring up the Modify FACC Colors legend. Here you may double click on the pattern, line or point symbol to bring up its related symbol selection window.

The Pick Pattern for Feature dialog allows you to change the color and hatch pattern for the selected area feature.







The Line Feature dialog will have the name of the selected feature as its title. This allows you to change the line weight and color.

The Symbol for Feature dialog allows you to change the point symbol for your selected point feature. Any .cgm, .gif or .bmp placed in your ..\mapdata\icons directory can be used as a point feature symbol. These must be pre-scaled.

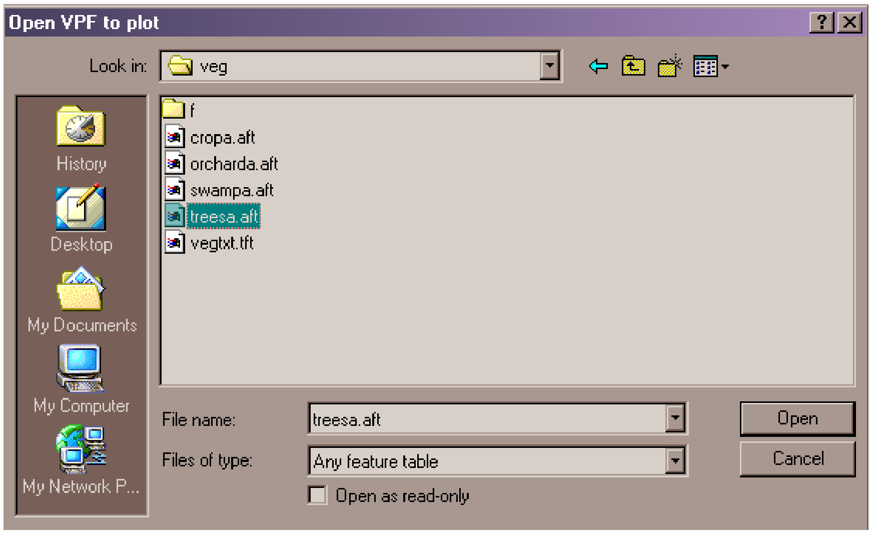
NOTE: When using the fast display by-table method many of the patterns and lines will need to be redefined the first time you use a particular data set. Also many of the point symbols will not have an assigned symbol.

Quick Display of Individual VPF Features

To display individual features from your VPF data set in a new window click

on the <VPF> button →  then select VPF Keyboard Selection from the drop down menu.

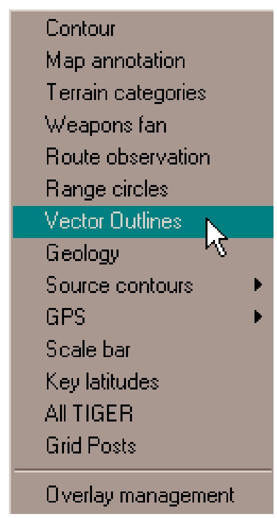
set your Files of Type to Any Feature Table and select the desired .AFT, .LFT or .PFT file from the desired themes subdirectory such as Hydrology, Industry, Population, Transportation et cetera.

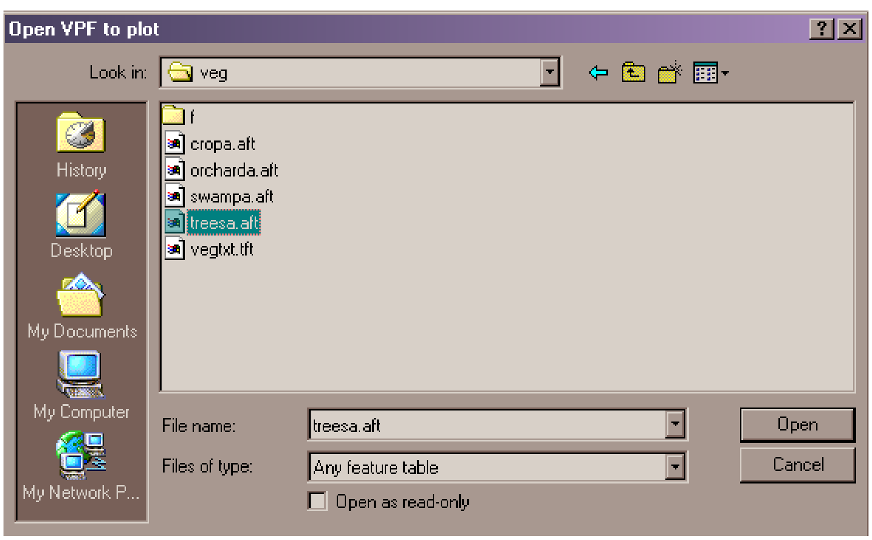


These same procedures for defining index features, selection of area of interest and display properties of VPF data as outlined in the previous section will apply.

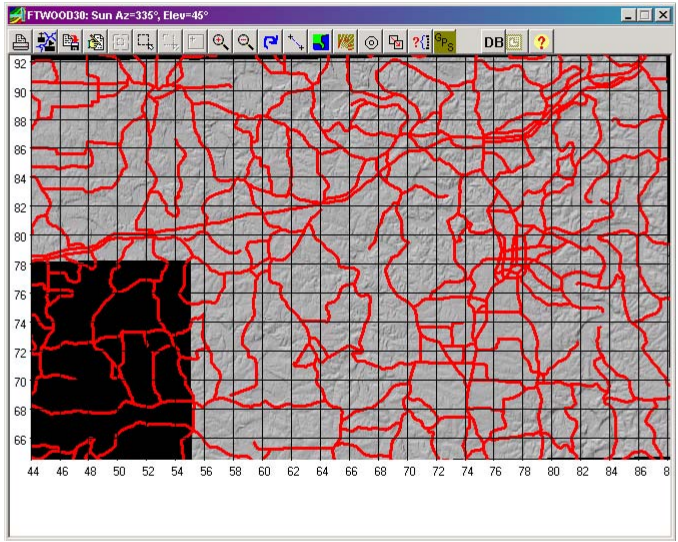
Quick Display of VPF Features Over a Map Background

With your current elevation data, imagery or map displayed go to the main menu and select OVERLAY / VECTOR OUTLINES →

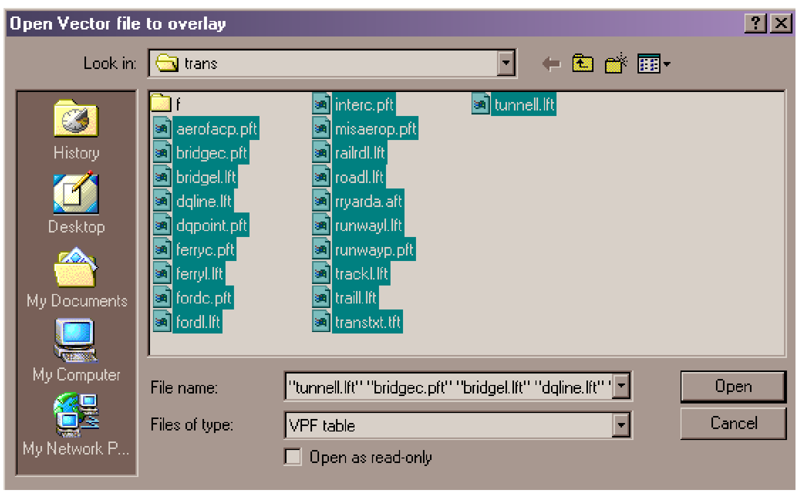




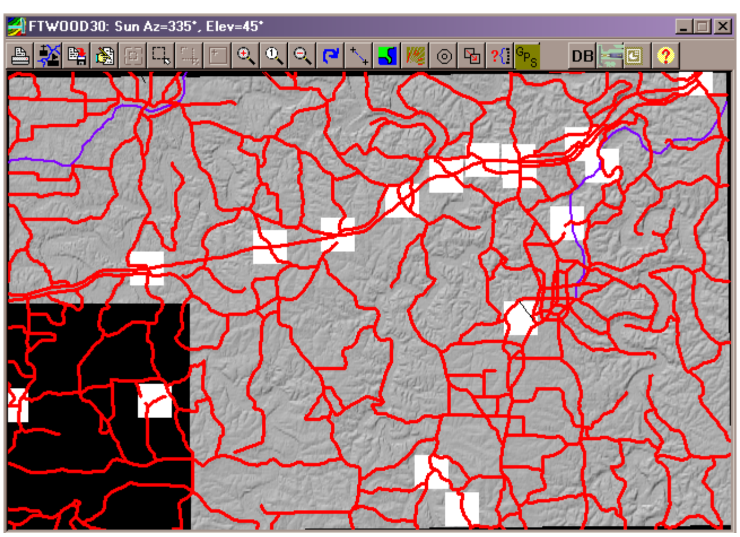
This will bring up the Open VPF to plot window. You can set your Files of Type to Any Feature Table and then select the desired .PFT, LFT, or .AFT feature table file to be displayed.



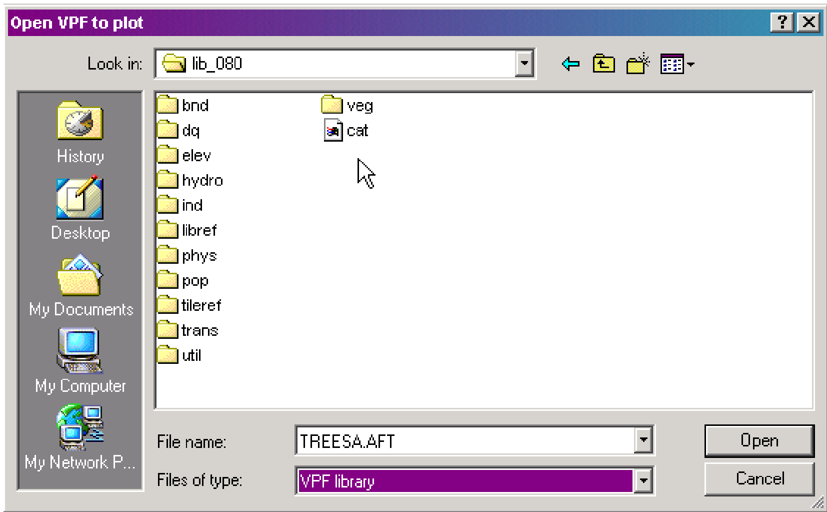
Here we have chosen to display the roads line feature table Roadl.lft.



Note you can select and display more than one feature table by highlighting all desired features. Here we have selected all the transportation features within the transportation folder.

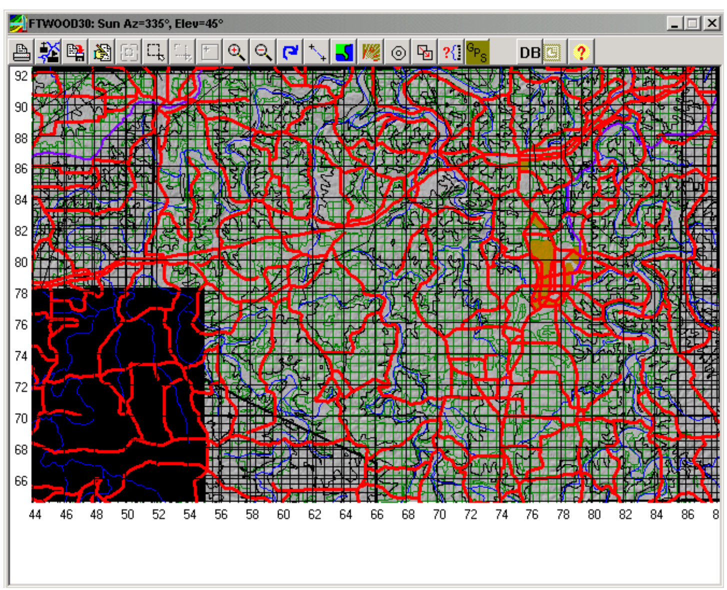


We can just as easily display our entire VPF data set over our map background by again selecting OVERLAY / VECTOR OUTLINES. This will bring up the Open VPF to plot window.



Set Files of Type to VPF Coverage and then select the (.CAT) catalog file.

The entire data set, which covers your current display, will be loaded and displayed over your map background.



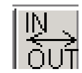
Here we have displayed the entire Vmap1 data set over our elevation data shaded relief.

The same procedures for turning on/off themes and display properties of the data as outlined in the previous section will apply.

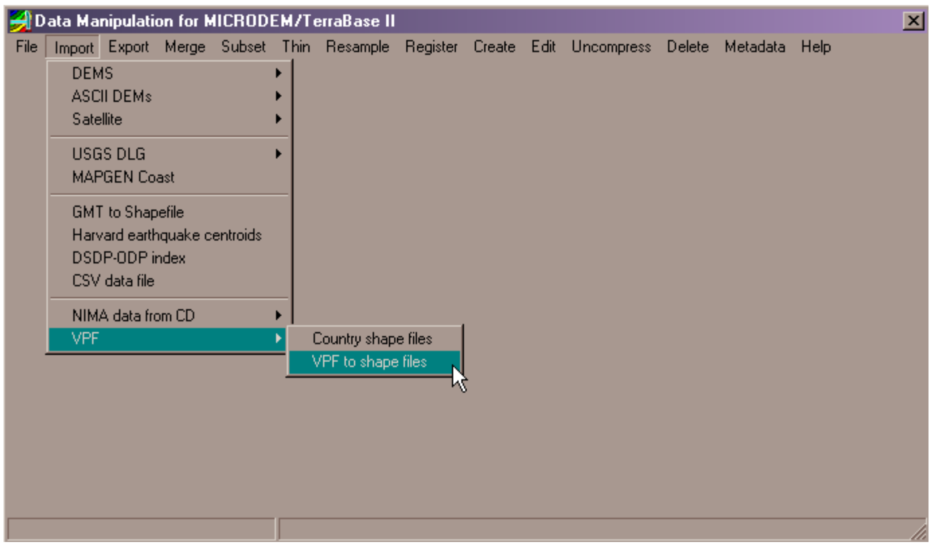
Importing VPF Data to Shape File Format

Converting VPF data to Shape file format during display is not recommended since this method is extremely slow. You may quickly convert your VPF data by using the Data Manipulation menu.

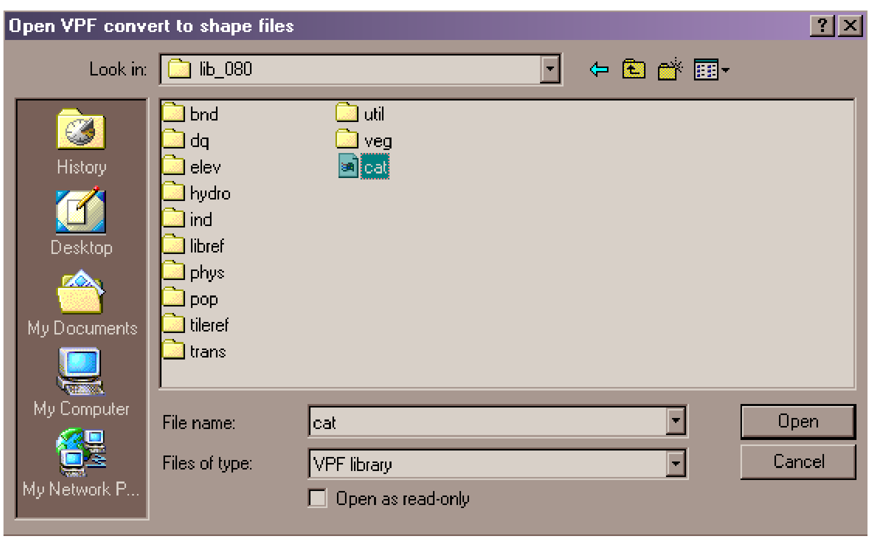
Converted database files may be utilized along with the extensive query and ID functions built

into MicroDEM for search and analysis of attribute data. Click on the <IN-OUT> button → 

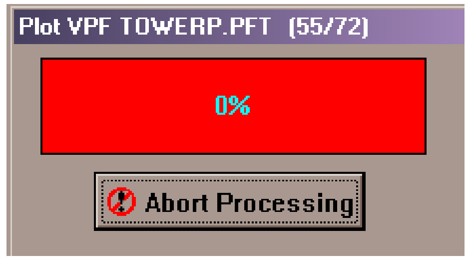
to bring up the Data Manipulation for MicroDEM/TerraBase II window.



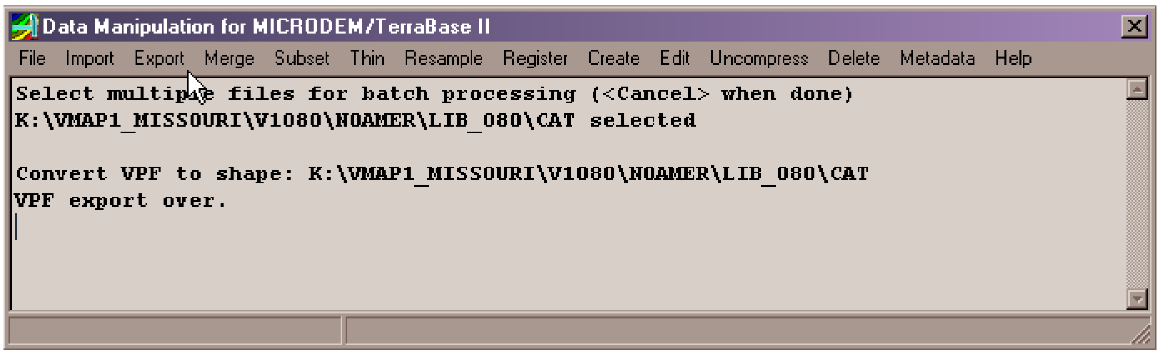
Select Import and VPF to shape files from the menu to bring up the Open VPF to convert to shape files window.



Here you should set your Files of type to VPF library then navigate to and select the (.CAT) file for your VPF coverage. **NOTE:** selecting Files of type: Any feature table, Area feature table, Line feature table or Point feature table will allow you to convert an individual feature table rather than the entire coverage.



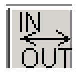
A series of progress bars will be displayed for the individual features within your dataset.

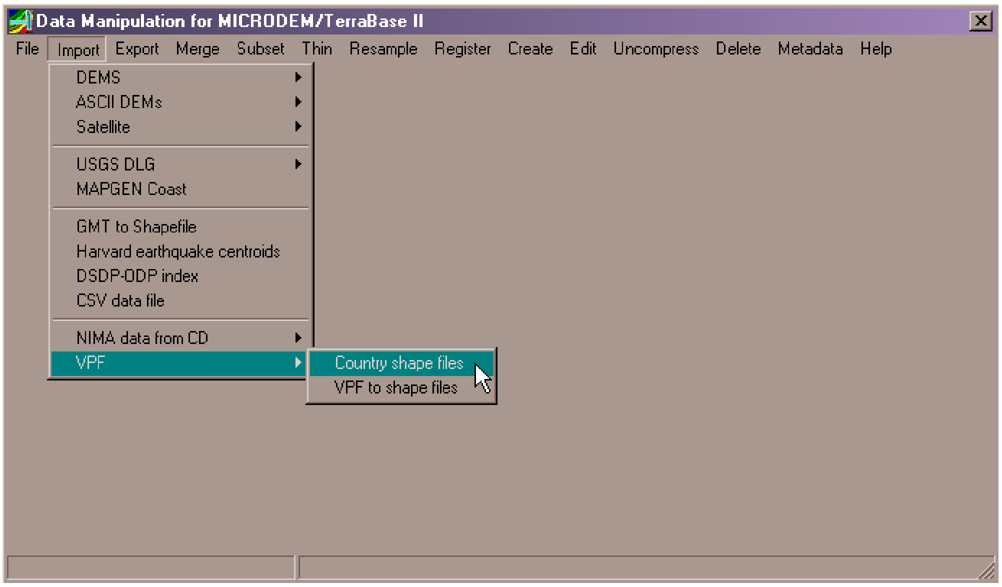


Information regarding the import process is displayed in the Data Manipulation window. When the process is completed the readout will display the message VPF export over. The converted data will be written to your..\MapData\NimaData\VPF-Shapes directory in a subdirectory related to the specific coverage.

Import and Display of NIMA Country Data

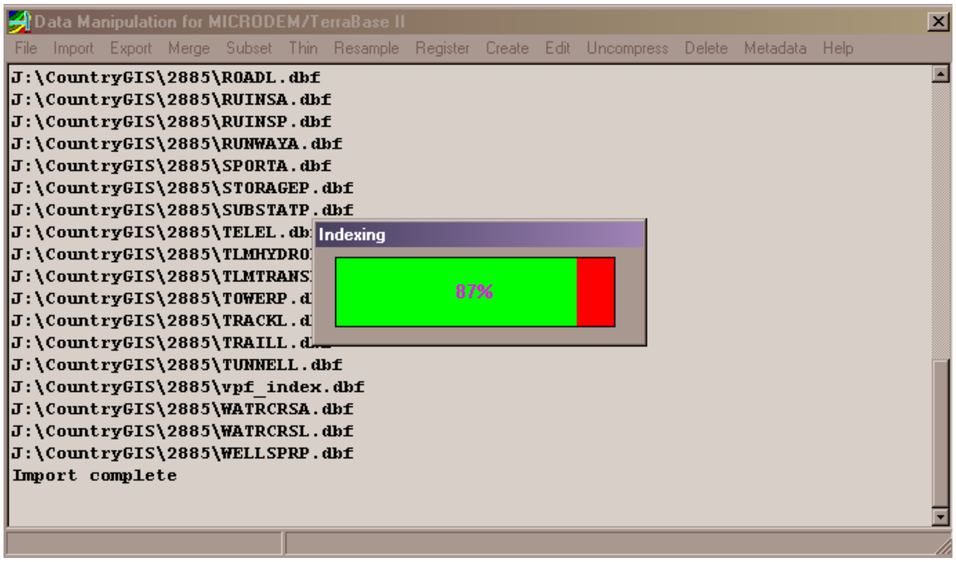
Converting NIMA Country Database data to Shape file format is not necessary since the files are already distributed in this format. However, importing these data sets is necessary if you plan to use the NIMA database method to load the data or if you plan to use GeoSym map symbology to display the data.

Click on the <IN-OUT> button →  to bring up the Data Manipulation for MicroDEM/TerraBase II window.



Select VPF and Country shape files from the menu.

This will bring up the Directory for Country Shape Files dialog. Navigate to the directory containing your Country Database files and then click on the <OK> button.



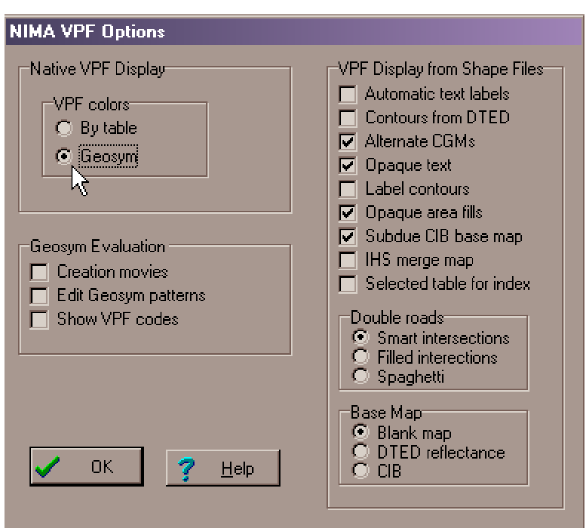
Information regarding the import process is displayed in the Data Manipulation window. When the process is completed the readout will display the message Import Complete. The VPF_INDEX.DBF index file will be written to your data directory.

Use the <VPF> Graphical Select or Keyboard Select method to display the data. If you use the keyboard method you will select the VPF_INDEX.DBF file from your data directory.

Using GeoSym Map Symbology to Display VPF Data

NOTE: You must be running the Windows NT ,2000 or XP operating systems to utilize GeoSym! Select Options from the main menu then select the Vector Maps tab. Click on the <VPF Options> button → 

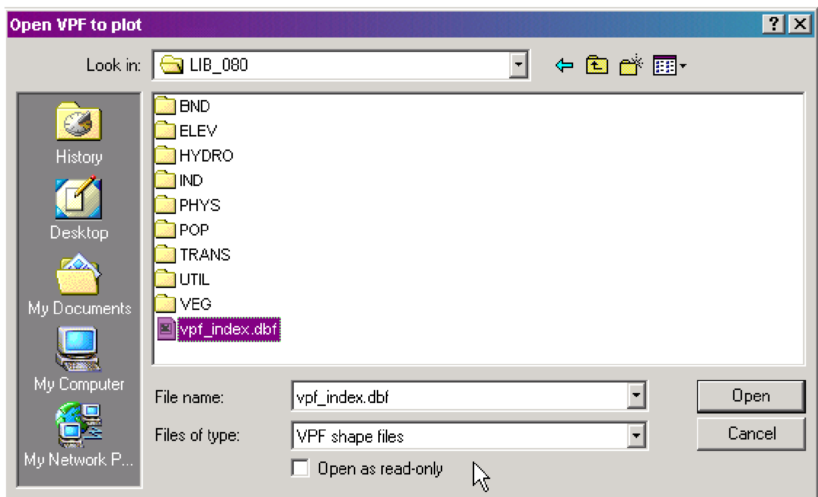
This will bring up the NIMA VPF Options window.



Display the data using the NIMA Geosym symbology by selecting the Geosym radio button under the Native VPF Display section. If you select the Blank map radio button from the Base Map section your data will be displayed in a new window. If you select the DTED reflections radio button your VPF data will be displayed over a shaded relief map background. If you select the CIB radio button your data will be displayed over Controlled Image Base background. **NOTE:** You must have the DTED or CIB data for your area of operations pre-imported in your NIMA Database for these last two options to work. See **Chapter 2** Loading and Displaying Data with the NIMA Database.

To display the VPF data in a new map window click on the <VPF> button → 

This will bring up the Open VPF to plot window.



Here you set Files of Type to VPF shape files and then select the VPF_INDEX.DBF file to display your whole data set. Selected index features will now be displayed for your data set and a small popup menu will appear.

The VPF Pop-up menu will allow you to change the Index Tables. These are the first features to be drawn from your data set. These allow you to determine the extent of your data and allow you to define a subset to be plotted if necessary.

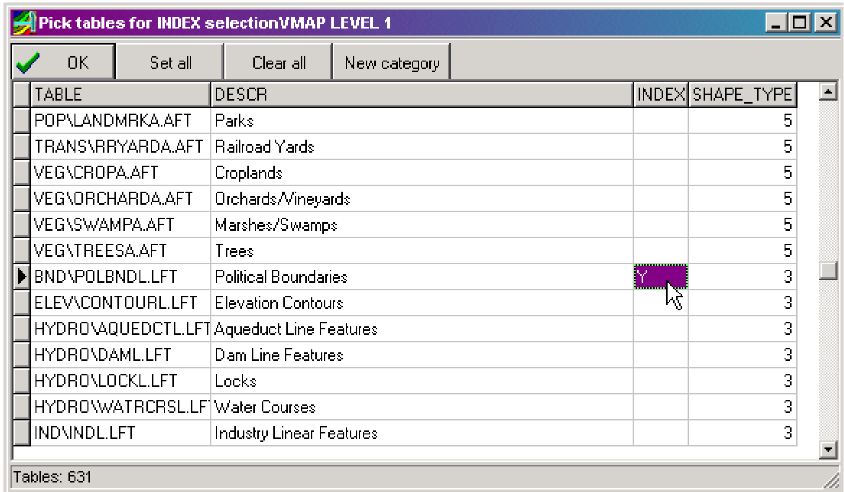
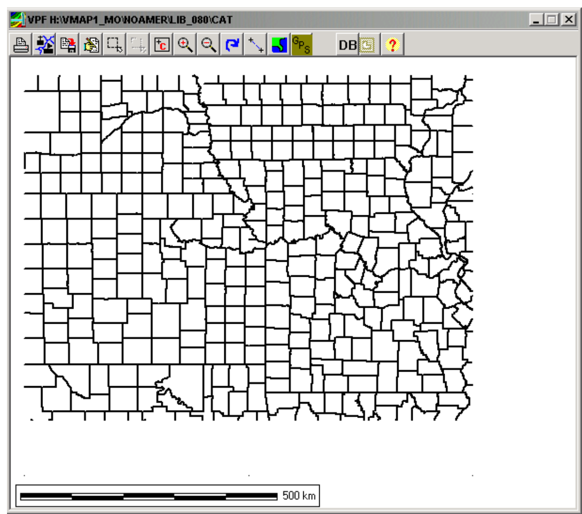
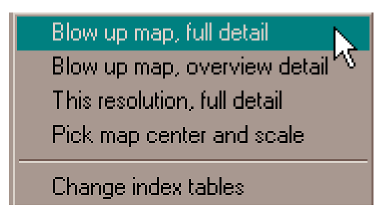


TABLE	DESCR	INDEX	SHAPE_TYPE
POP\LANDMRKA.AFT	Parks		5
TRANS\RRYARDA.AFT	Railroad Yards		5
VEG\CROPA.AFT	Croplands		5
VEG\ORCHARDA.AFT	Orchards/Vineyards		5
VEG\SWAMPA.AFT	Marshes/Swamps		5
VEG\TREESA.AFT	Trees		5
BND\POLBNDL.LFT	Political Boundaries	Y	3
ELEV\CONTOURL.LFT	Elevation Contours		3
HYDRO\AQUEDCTL.LFT	Aqueduct Line Features		3
HYDRO\DAML.LFT	Dam Line Features		3
HYDRO\LOCKL.LFT	Locks		3
HYDRO\WATRCRSL.LFT	Water Courses		3
IND\INDL.LFT	Industry Linear Features		3

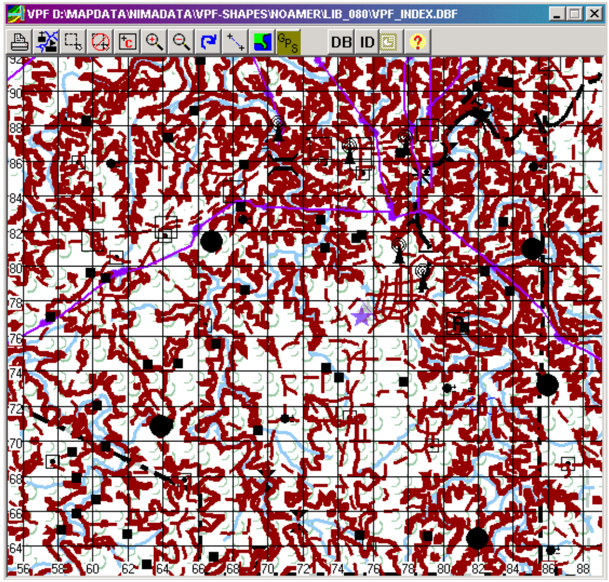
Using your Index Tables double click in the INDEX column to mark the selected feature with/without a 'Y' to display the feature initially. Once selected you will use the index table feature to further define the area you wish to display fully.



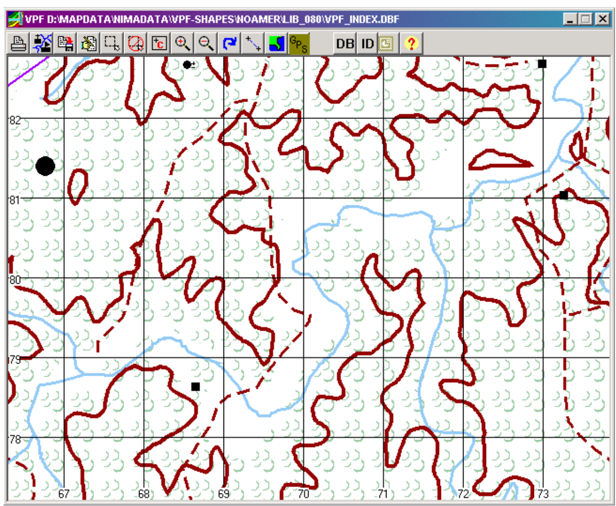
Here we have chosen Political Boundaries as our index feature. This is the only feature initially displayed. You will again be offered the VPF Pop-up menu.



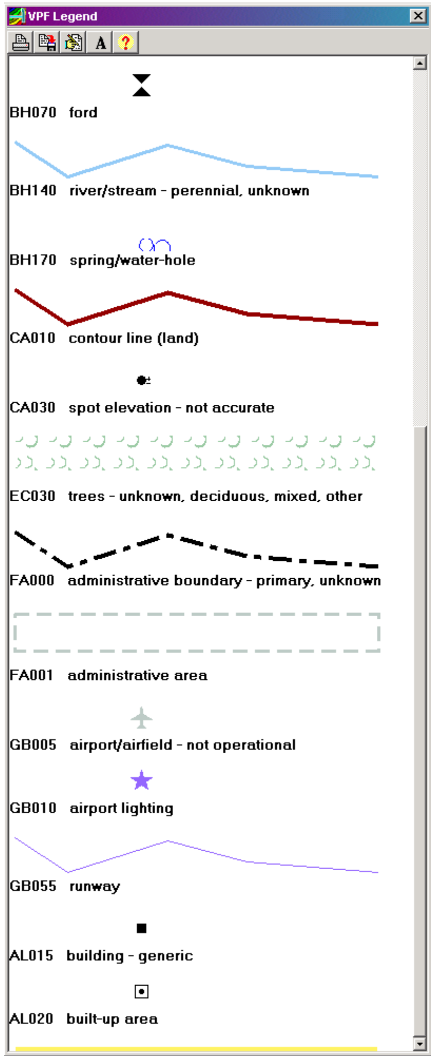
To load the entire data-set select This resolution, full detail from the list. Be aware that this process could take a VERY long time if you have a large data set such as this Vmap 1. To load a selected area of the data select Blow up map, full detail from the list. Click on the North West corner of your area of interest, hold the mouse button down and drag to the South East corner and release. The individual layers/themes will be displayed in the order defined by the specification for that data set.



Here we have displayed the southern half of Pulaski County covering FLW with GeoSym symboloby. The map should be enlarged or subset in order to appear properly.



The GeoSym Legend for your data set is displayed by selecting FILE/VPF LEGEND at the main menu.



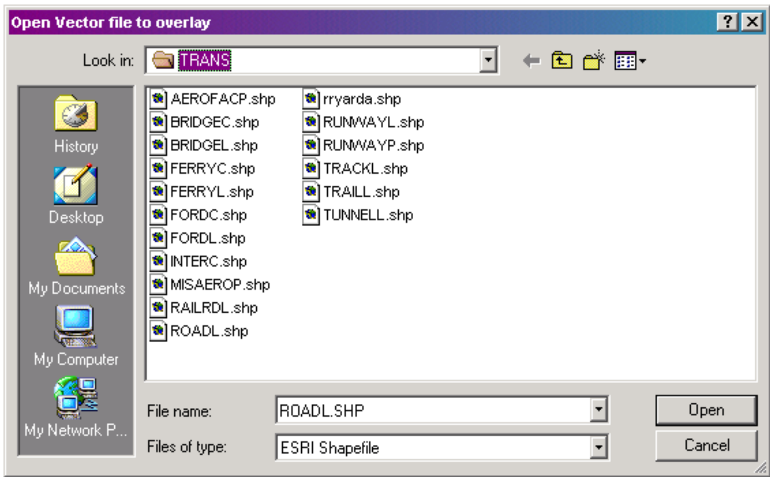
The key differences in displaying your data with Geosym symbology are the following:

- The data will display more slowly
- The data will be displayed using the **prototype** NIMA Geosym map symbology
- The data must be converted to shapefiles and database files which are stored in your ..\Mapdata\NimaData\VPF-shapes subdirectory. These can be used for standard data base operations.

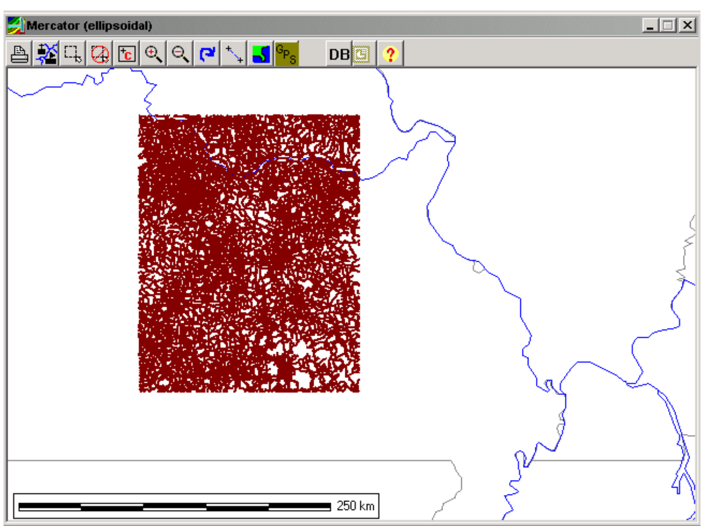
Database Manipulation and Query

As shown in the previous sections VPF data may be converted to shape files and associated database attribute files by either selecting GeoSym as the Native VPF Display or by selecting Import VPF to Shape Files via the Data Manipulation menu.

Users of Windows 95/98 and ME will not be able to display the 32bit GeoSym symbology. The individual shape files may be displayed with quick symbology on any Windows operating system. At the main menu select OVERLAY/VECTOR OUTLINES to bring up the Open Vector file to overlay window.

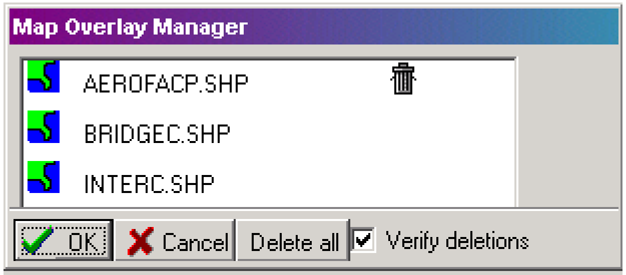


Set your Files of type to ESRI Shapefile, navigate to the desired theme subdirectory such as TRANSportation and select one or more shapefiles to display.



Here I have displayed the ..\Mapdata\Nimadata\VPF-Shapes\NOAMER\LIB_080\TRANS\ RoadL.shape file. **Note** that this shapefile is a subset of the whole Vmap1 data set since the original data was displayed as a GeoSym subset of the whole using the Blow up map Full detail option from the VPF popup menu.

Individual shapefiles may be manually sorted or deleted using the OVERLAY/OVERLAY MANAGER. The order of overlays in the Overlay Manager reflect the drawing order on your display. If one of your overlays is obscuring another simply click on that overlay and drag it to a new position in the stack. To delete a single overlay simply click on it and drag it to the trash can at the upper right corner of the manager window.



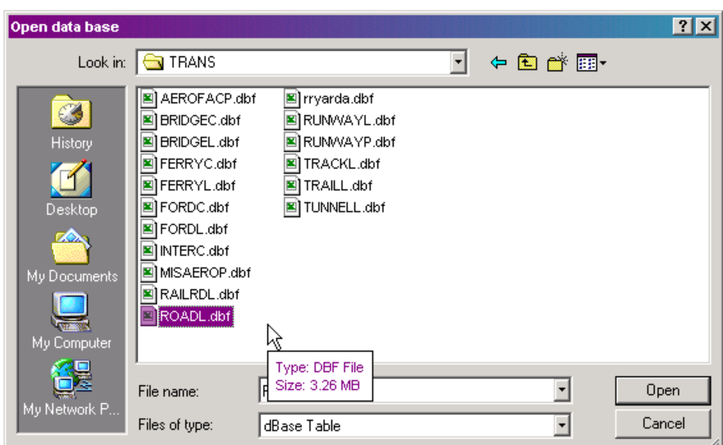
NOTE: If you only have a single overlay you will not get the pop-up Map Overlay Manager, you will simply be asked if you wish to delete the single overlay.

Filtering and Display of DataBase Attribute Files

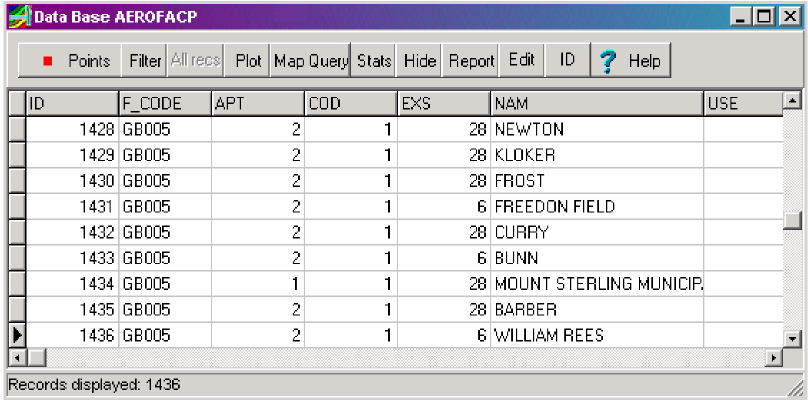
Once converted the attribute data may be filtered, searched and queried allowing the resulting records to be graphically displayed. Display selected dbase attribute files by clicking on the

<Database> button on the map display --> 

This will bring up theOpen data base window.

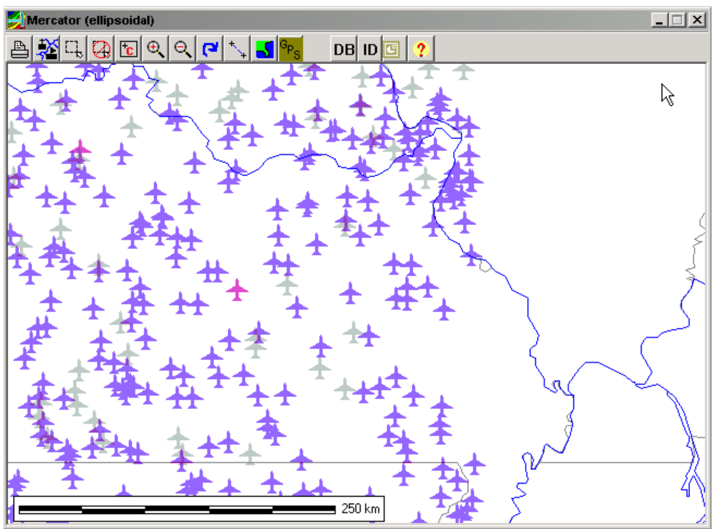


Here you set Files of type to dBase Table, navigate to your ..\Mapdata\Nimadata\VPF-Shapes directory and the specific subdirectory for the theme you wish to load.



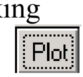
ID	F_CODE	APT	COD	EXS	NAM	USE
1428	GB005	2	1	28	NEWTON	
1429	GB005	2	1	28	KLOKER	
1430	GB005	2	1	28	FROST	
1431	GB005	2	1	6	FREEDON FIELD	
1432	GB005	2	1	28	CURRY	
1433	GB005	2	1	6	BUNN	
1434	GB005	1	1	28	MOUNT STERLING MUNICIP.	
1435	GB005	2	1	28	BARBER	
1436	GB005	2	1	6	WILLIAM REES	

This is a part of the attribute table for the AEROFACP.DBF file. Note the slider bars along the bottom and right edge of the table which allow access to the remaining information. The window may also be resized by clicking and holding down the mouse button and dragging the edge or corner of the table to the desired size.



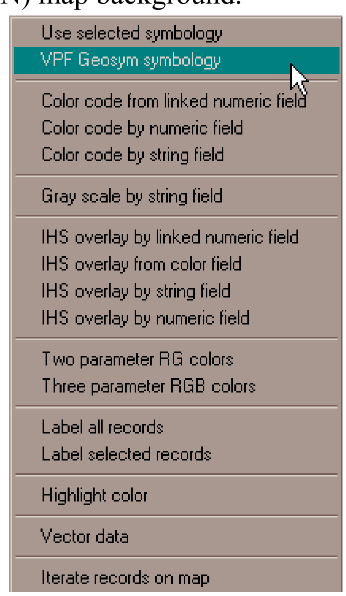
This is the AEROFACP.DBF file plotted on the world vector (.SIN) map background. Here I've used the GeoSym symbology to represent ALL the airfields.

Plot selected dbase files by clicking on the <Plot> button → on the related database table.

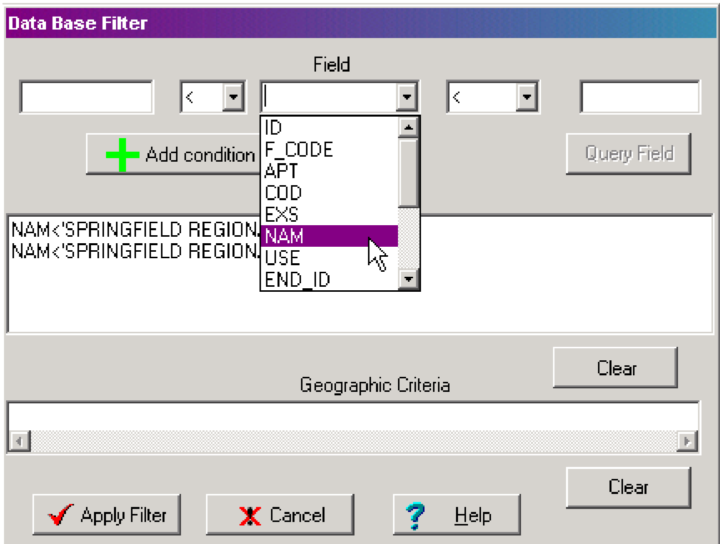


This will bring up the Plot menu where you select → VPF GeoSym symbology if you're running a Windows NT or 2000 PC.

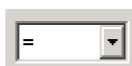
Select Use selected symbology if you're running a Win 95/98/Millenium PC.

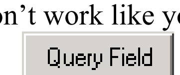


Filtering of records is a very useful function where Boolean Logical comparisons may be made between specific fields and their content. Click on the < Filter> button → 

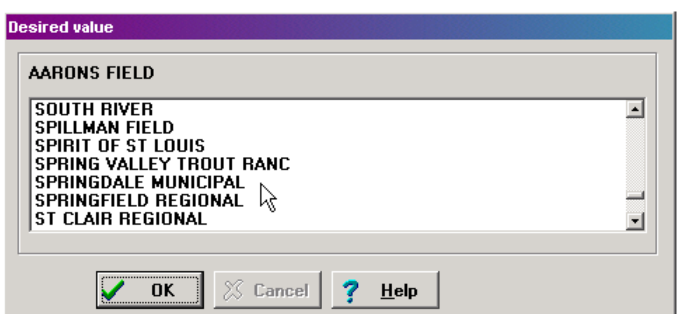


This will bring up the Data Base Filter window.

To find a feature of a specific name select the NAM Field from the list as shown above, set the right hand operator to equals 

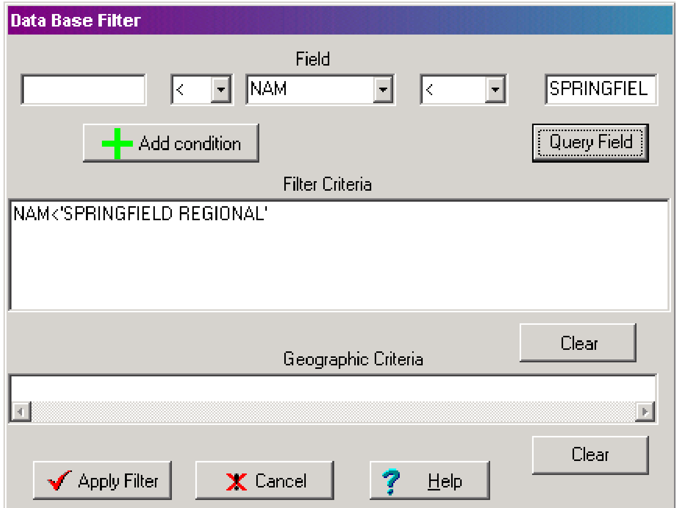
(Be sure to select the proper Boolean logic on the correct side of the equation or your filter won't work like you want it to.)
Next click on the <Query Field> button --> 

to select the desired name from the Desired Value popup window.



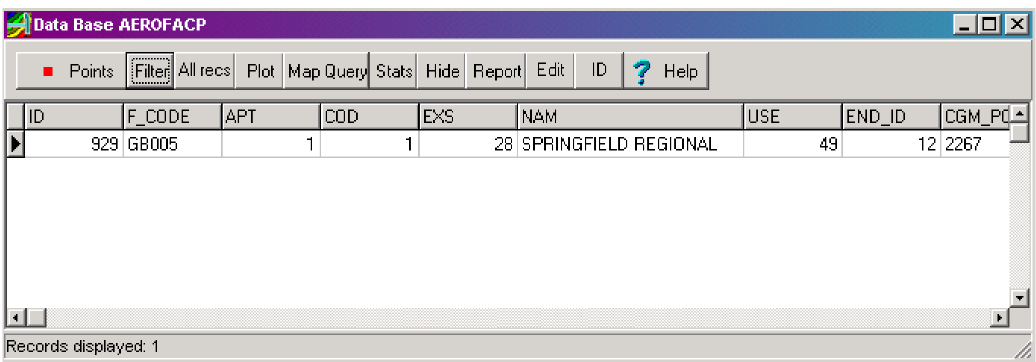
When you're satisfied with your equation click on the

<Add condition> button → 



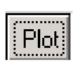
NOTE: You can apply more than a single Filter Criteria for a given search.

Finally click on the <Apply Filter> button 



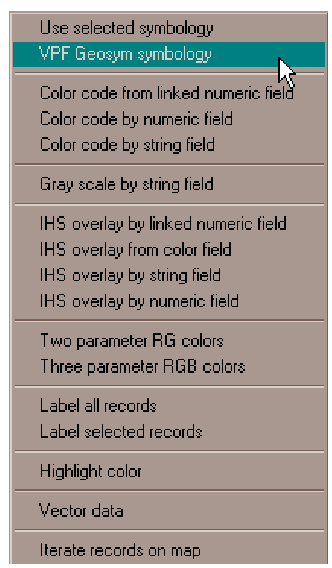
The records that match your query will be displayed in the Data Base table for your feature.

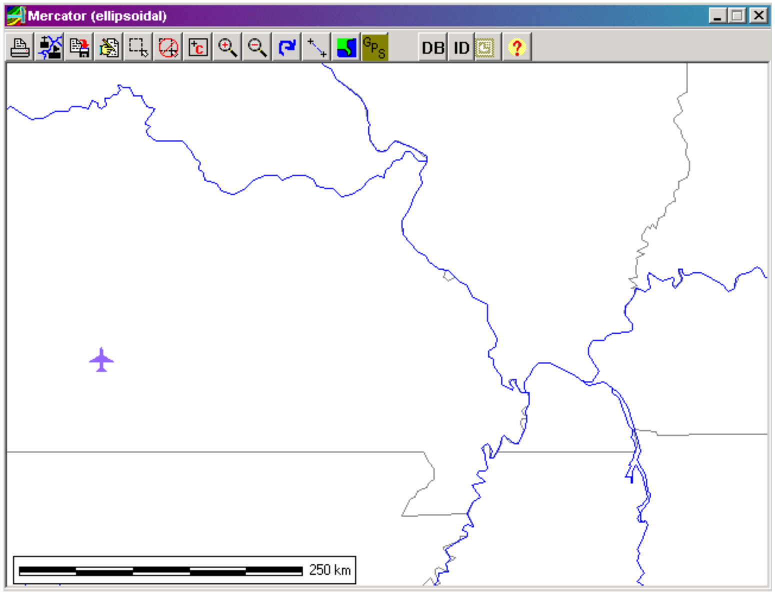
Plot selected dbase files by clicking on the

<Plot> button →  on the database table.

This will bring up the Plot menu where you select VPF GeoSym symbology if you're running a → Windows NT or 2000 PC.

Select Use selected symbology if you're running a Win 95/98/Millenium PC.

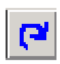




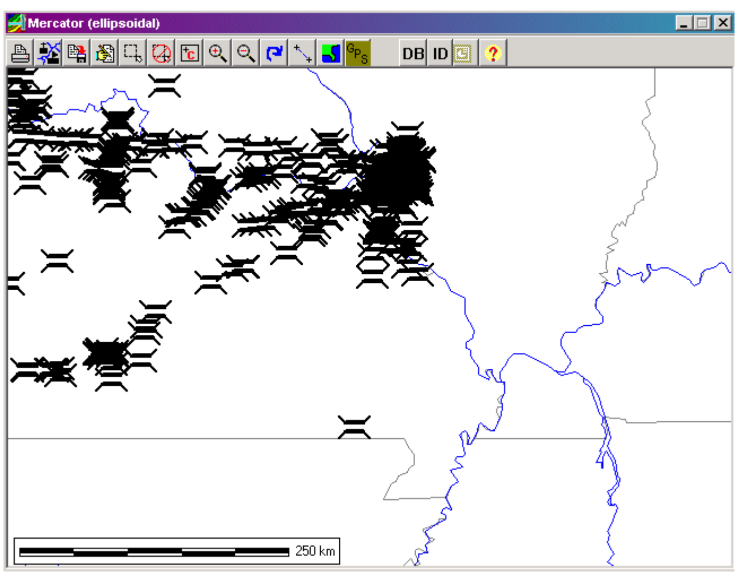
The filtered records will be displayed on your background map.

To restore all records for your feature table simply click on the <All recs> button --> 

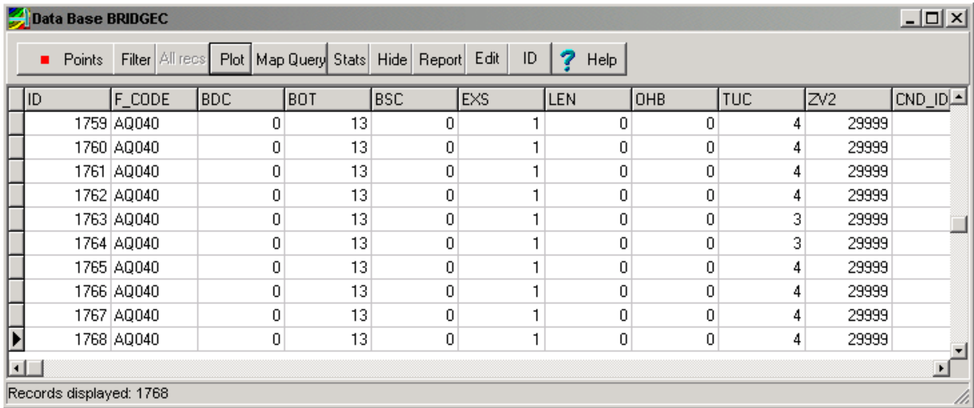
Database feature displays may be deleted by closing the related dbase table and clicking on the

<Force Redraw> button -->  on the map display.

Map Query of DataBase Attribute Displays



Here we have displayed BridgeC point data from my Vmap1 data subset from its database table.



ID	F_CODE	BDC	BOT	BSC	EXS	LEN	OHB	TUC	ZV2	CND_ID
1759	AQ040	0	13	0	1	0	0	4	29999	
1760	AQ040	0	13	0	1	0	0	4	29999	
1761	AQ040	0	13	0	1	0	0	4	29999	
1762	AQ040	0	13	0	1	0	0	4	29999	
1763	AQ040	0	13	0	1	0	0	3	29999	
1764	AQ040	0	13	0	1	0	0	3	29999	
1765	AQ040	0	13	0	1	0	0	4	29999	
1766	AQ040	0	13	0	1	0	0	4	29999	
1767	AQ040	0	13	0	1	0	0	4	29999	
1768	AQ040	0	13	0	1	0	0	4	29999	

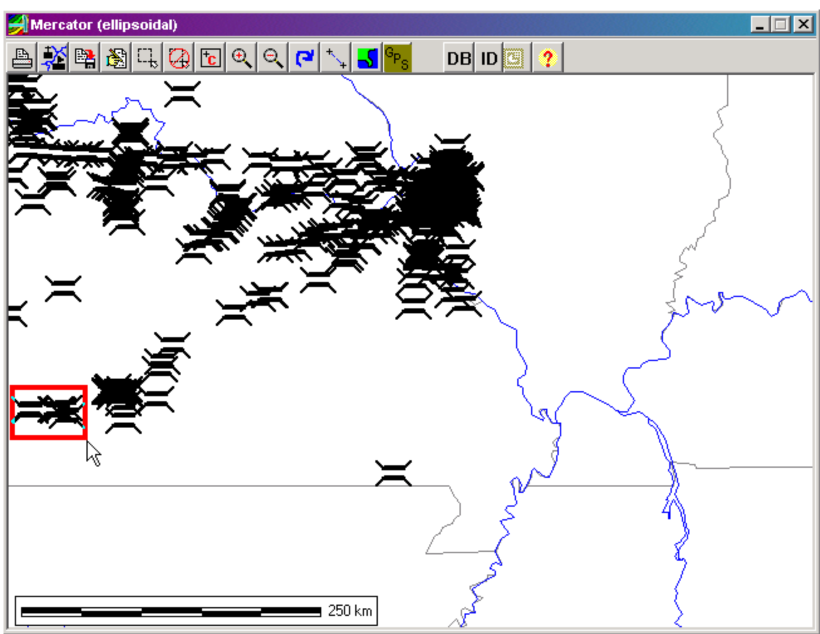
With your database attribute data displayed you may perform graphical queries by clicking on the

<Map Query> button 

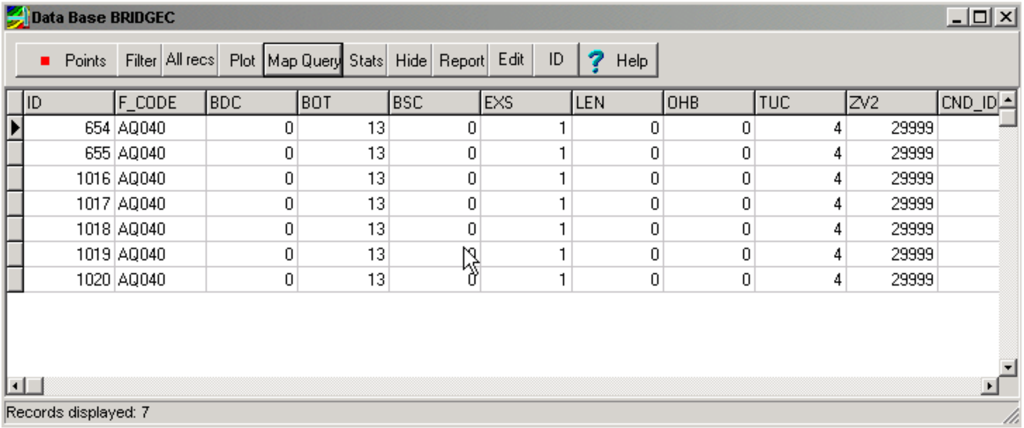
this will bring up the Map Query popup menu.

Here you should select Select region from the menu then click on the

Map display at the North West corner of your region, hold down the mouse button and drag the mouse pointer to the South East corner of the region you wish to query as shown below.



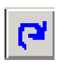
The records from within the region you defined will be listed in the DataBase table for that feature as shown below.



ID	F_CODE	BDC	BOT	BSC	EXS	LEN	OHB	TUC	ZV2	CND_ID
654	AQ040	0	13	0	1	0	0	4	29999	
655	AQ040	0	13	0	1	0	0	4	29999	
1016	AQ040	0	13	0	1	0	0	4	29999	
1017	AQ040	0	13	0	1	0	0	4	29999	
1018	AQ040	0	13	0	1	0	0	4	29999	
1019	AQ040	0	13	[illegible]	1	0	0	4	29999	
1020	AQ040	0	13	0	1	0	0	4	29999	

To restore all records for your feature table simply click on the <All recs> button --> 

Database feature displays may be deleted by closing the related dbase table and clicking on the

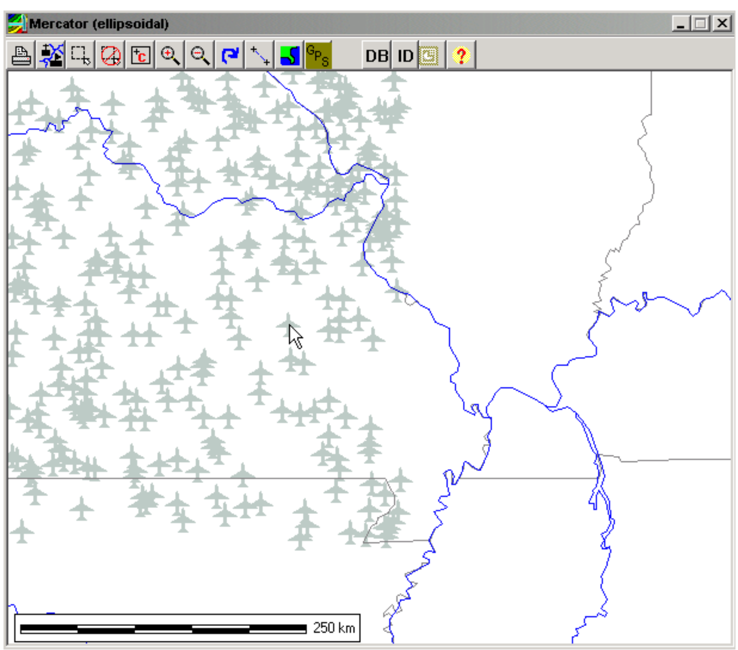
<Force Redraw> button -->  on the map display.

ID Query of Individual Map Features

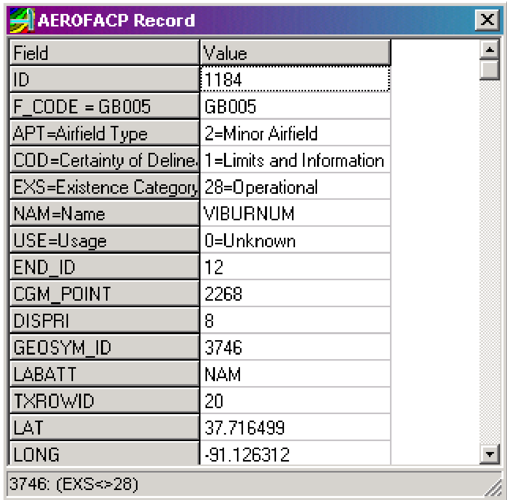
Another method of performing a map query to bring up the attributes for a feature on your map is

to utilize the <ID> button → 

After clicking on the <ID> button simply double-click on the individual feature you wish to investigate.



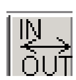
This will bring up the attribute data record for that specific feature.

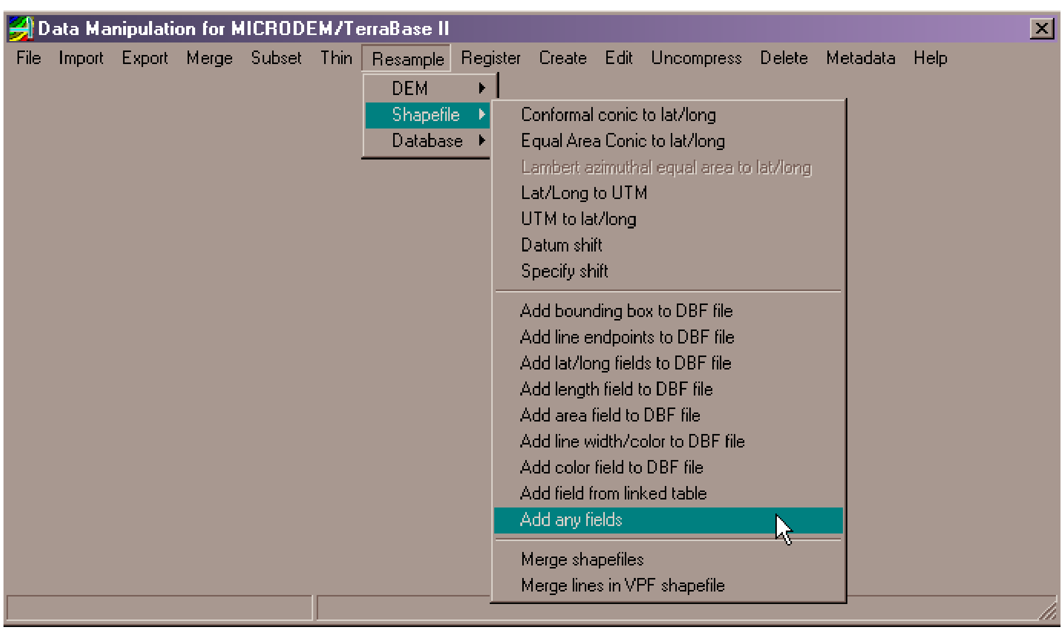


Click on the <X> button →  to close the feature's popup record window and redisplay all records in your Data Base table.

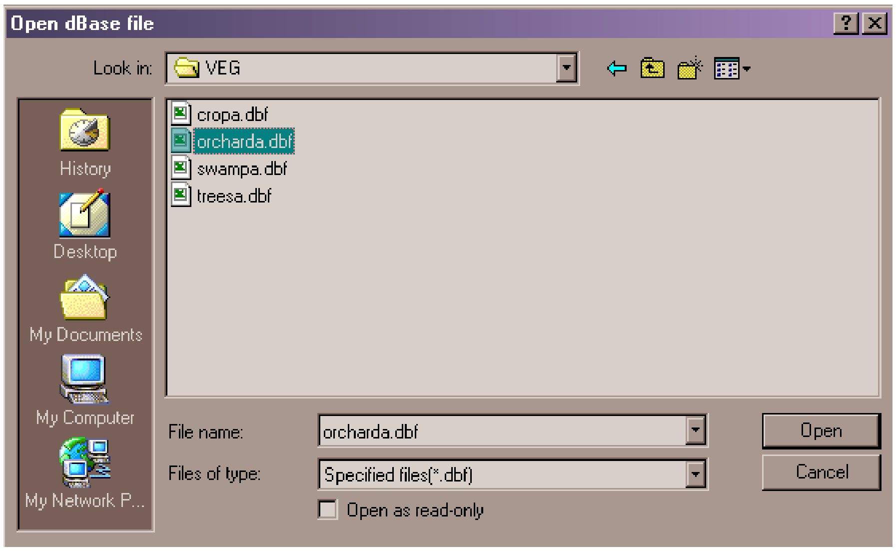
Adding Data Fields to Shape Database Files

If you need to add another field to your shape database file it's easy.

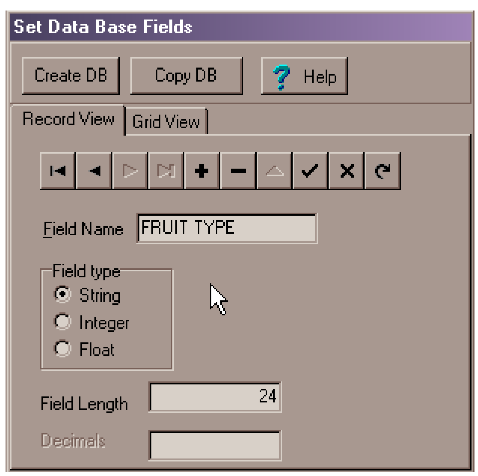
Click on the <IN-OUT> button →  to bring up the DataManipulation for MicroDEM/TerraBase II window.



Here you select RESAMPLE/SHAPEFILE and any of the following Add functions: Add Bounding Box, Add Line Endpoints, Add Lat/long field, Add Length field, Add Area field, Add Line Width/Color, Add Color field, Add Ffield from Linked Table and Add Any Field. In order to demonstration the functionality we will go through the addition of new field to one of our preexisting shape dBase files by selecting Add any fields. This will bring up the Open dBase file window.



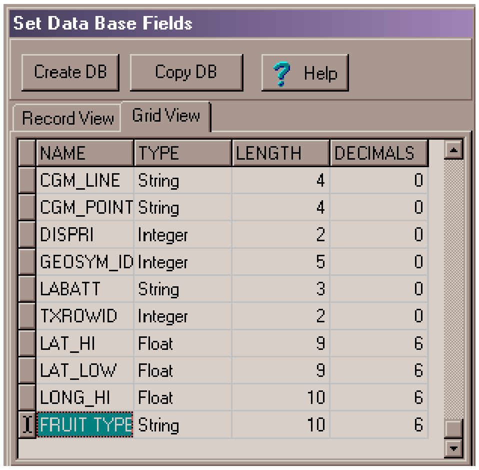
Navigate to the location of the dBase file associated with the shape file you wish to modify and select it. This will bring up the Set Data Base Fields interface.



Type the name of the new field in the Field Name data entry field. Select the type of field you wish to add by clicking on one of the Field types: String, Integer or Float. If you wish to have a field length other than the default then change the value in the Field Length data entry field.

When your are ready to add the new field click on the <+> button → 

Click on the Grid View tab to see the structure of your database table with your new field.

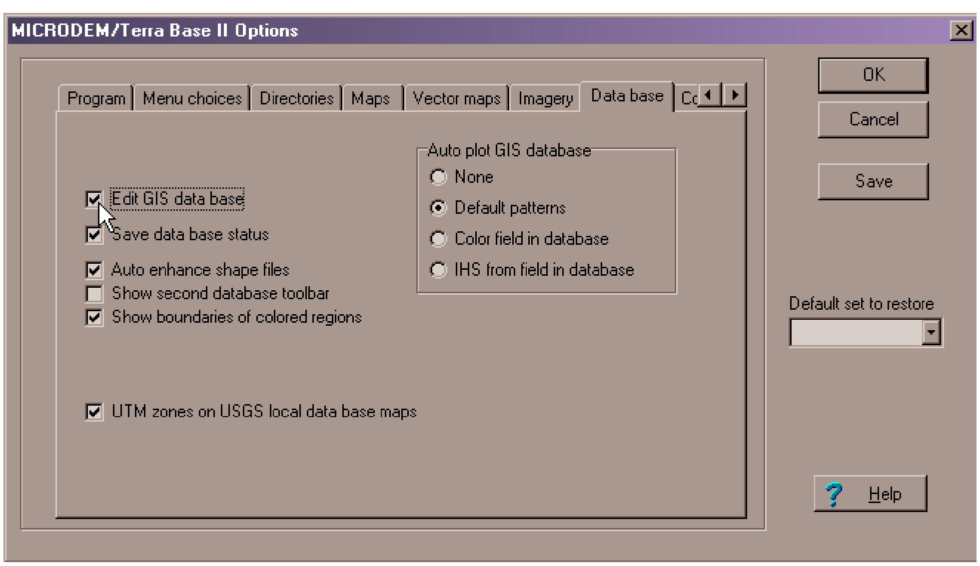


To enable the change to your current database file click on the <Copy DB> button → 

A pop-up confirmation dialog window will ask if you wish to Add the fields now. Select the <YES> button to complete the addition of the new field to your dBase file.

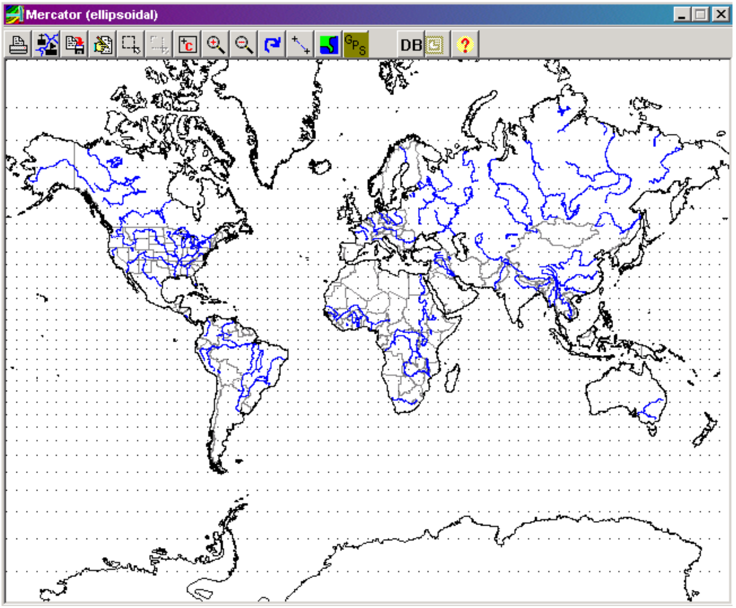
Editing Shape Database File Attributes

If you need to change attribute data for your shape files you may do so but be careful since this function will allow you to corrupt your data. First you will need to go to the main menu and select OPTIONS then at the Database tab check the Edit GIS data base box.



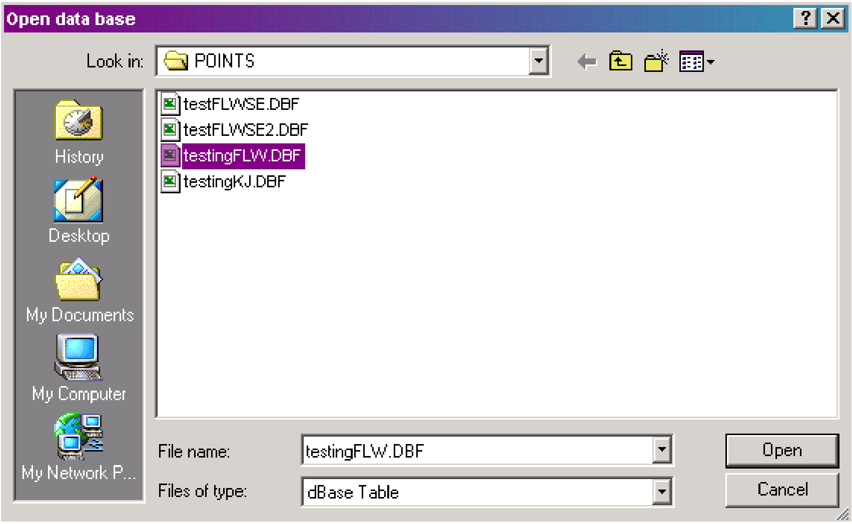
Click on the <OK> button to close the MicroDEM/TerraBase Options window. Open a background map for your AOI or simply open the World Vector .SIN map by clicking on

the <Open Vector Map> button → 

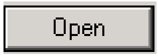


Click on the <DB> button → 

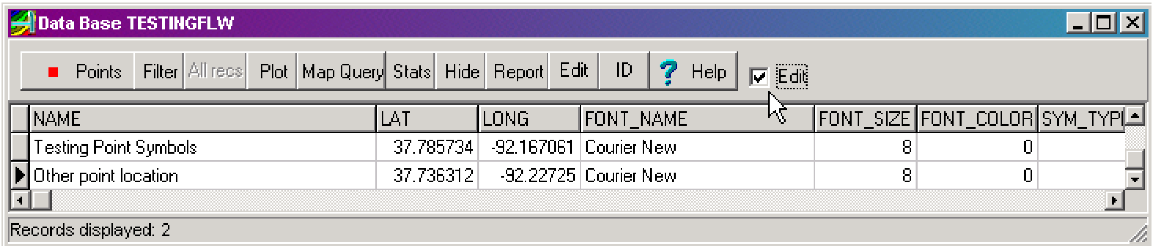
to bring up the Open data base window.



Navigate to the location and select the desired .DBF file you wish to edit by double clicking on

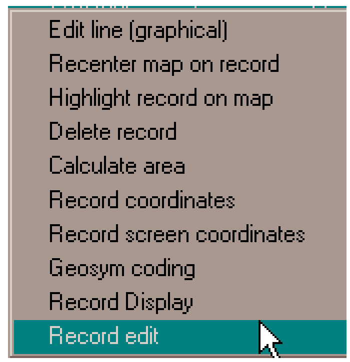
the file name or by clicking on the <OPEN> button → 

This will bring up the Data Base table for the select file.

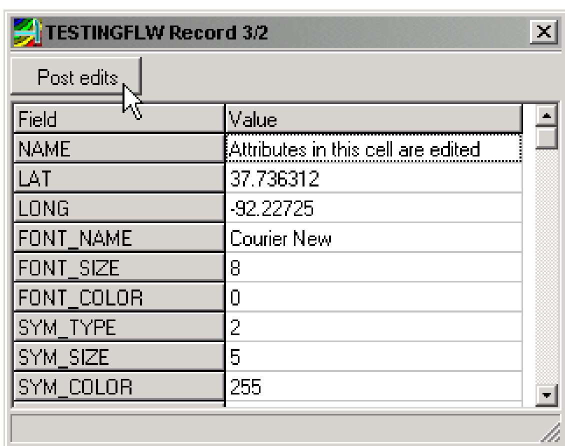


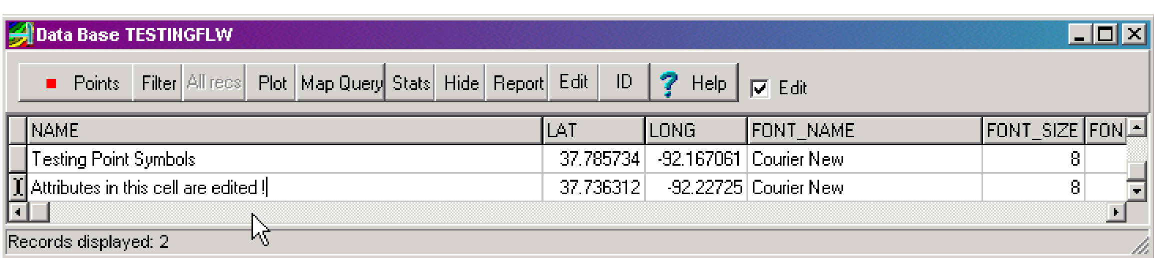
Here you must check the [ ] Edit box before you can actually change any of the cell contents. Then you can double click on a record to bring up the Editing menu.

Here select Record edit from the menu →



The record will appear in an edit window. After you make any desired changes, insure that you select the <Post edits> button to update the database.





As you can see the attribute data in the second record cell has been altered.

Be careful when making changes to your data since you may make your data inaccurate or unusable. You should work with a copy of your data until you are confident of your ability to edit the file without corrupting it.

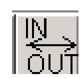
Displaying DTSS Digital Overlay Products

The Digital Topographic Support System (DTSS) utilized by Engineer Terrain Teams provides vector data map overlays to the various Army Battle Command Systems (ABCS) via Digital Overlay Products (DOP). Each ABCS system will be capable of viewing these overlays using the DOP Viewer.

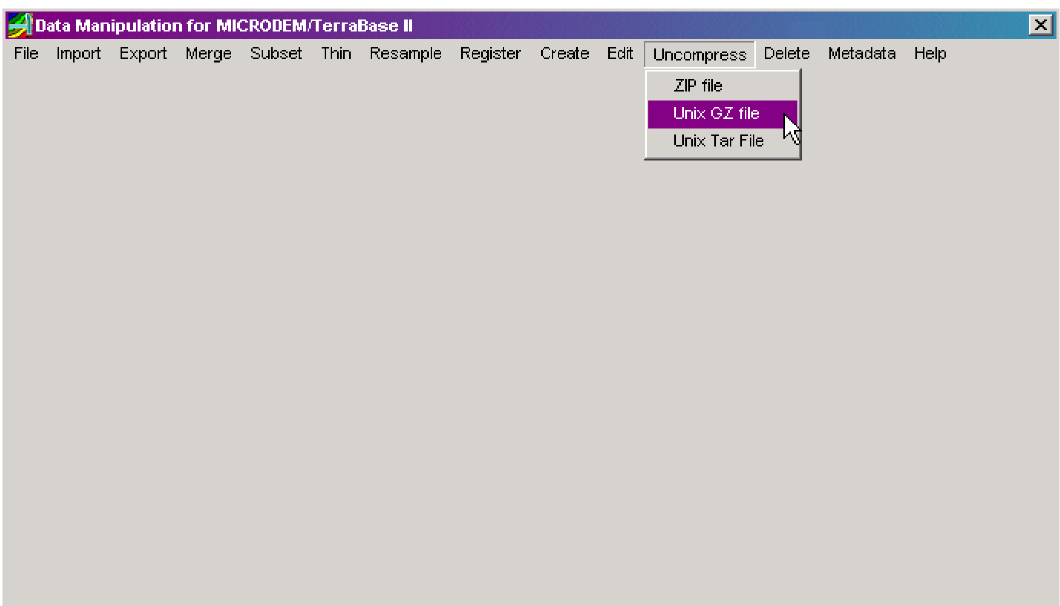
Standalone users on non-UNIX systems may view these products in MicroDEM by using the the DTSSOP function.

Decompressing Zip Gzip and Tar Files

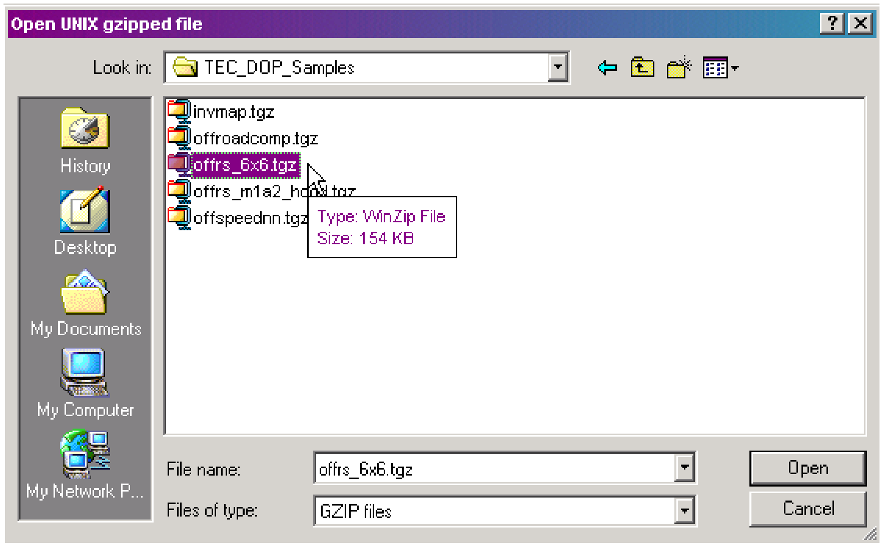
DOP overlays will be compressed in a (.TGZ) gzipped tar format. These files must first be decompressed in MicroDEM by clicking on the <IN-OUT> button →



This will bring up the Data Manipulation for MicroDEM/TerraBase II window.



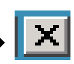
First select UNCOMPRESS then UNIX GZ File. This will bring up the Open UNIX gzipped file window.



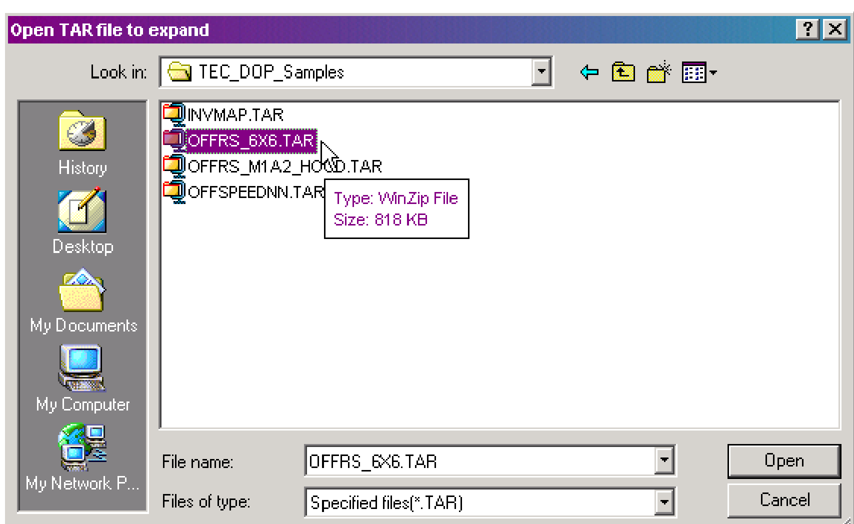
Select the desired (.TGZ) file to gunzip and click on the <OPEN> button → 

When the file has been un-gzipped a message will appear in the Data Manipulation window stating that the file is done and the Open UNIX gzipped file window will reappear.

```
expanding UNIX GZIP file: H:\TEC_DOP_SAMPLES\OFFRS_6X6.TGZ
 done; original file unchanged
```

Close the Open UNIX gzipped file window by clicking on the <X> button →  or by clicking on the the <CANCEL> button.

In the Data Manipulation window select UNCOMPRESS and then UNIX TAR File. This will bring up the Open TAR file to expand window.



Select the desired (.TAR) file to untar and click on the <OPEN> button → 

When the file has been untarred a message will appear in the Data Manipulation window showing the path to the completed .tar file.

```
EXTAR: H:\TEC_DOP_SAMPLES\OFFRS_6X6.TAR
|
```

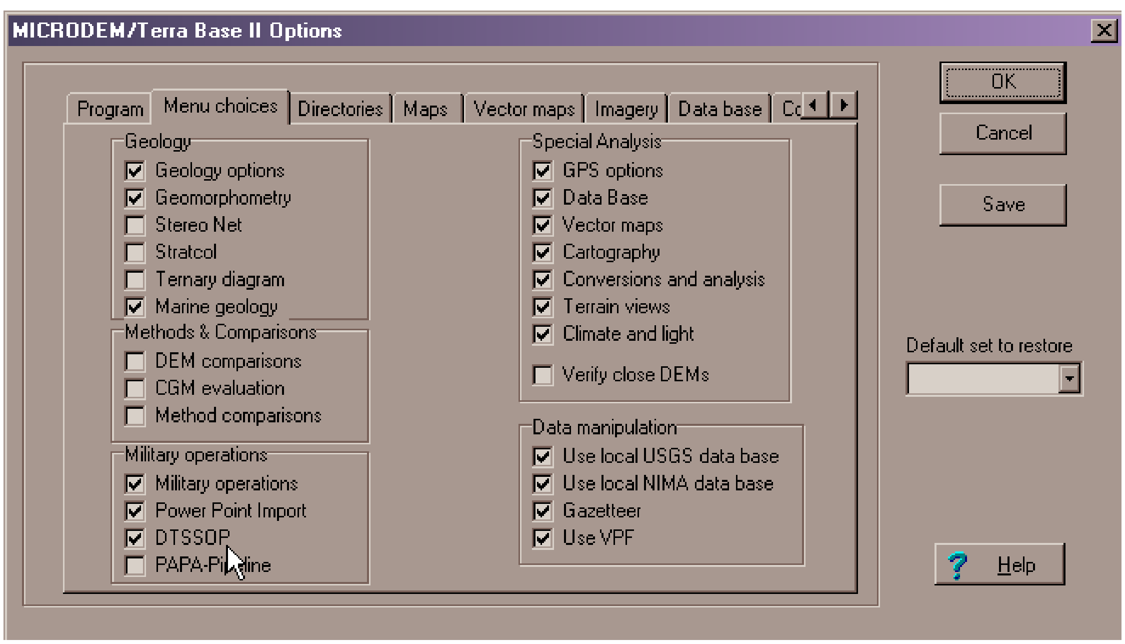
NOTE: Untarring files take time. If you have more than one .TAR file to process you may highlight the desired files using the <CTRL> button on your keyboard and your mouse. Once you've selected the desired .TAR files click on the <OPEN> button and the files will be processed **in-batch**. This procedure is useful when you wish to untar a large number of files or a series of large files and you must be away from your computer.

The decompressed DOP files now have .dtss extensions and may be displayed in MicroDEM via three different methods.

- Start the program with a **–DTSS** command line parameter.
- Use the <DTSS> button on the main GUI toolbar.
- Use the OVERLAY/VECTOR OUTLINES function to display the DOP as an overlay.

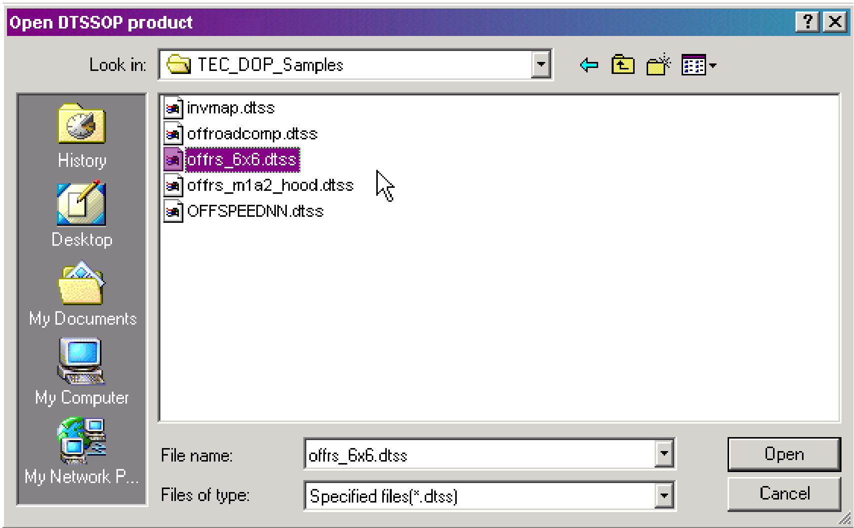
Display DOP Using the <DTSS> Button on the Main GUI Toolbar

To enable the <DTSS> button go to the main menu and select OPTIONS then at the Menu Choices tab check the DTSSOP box [].



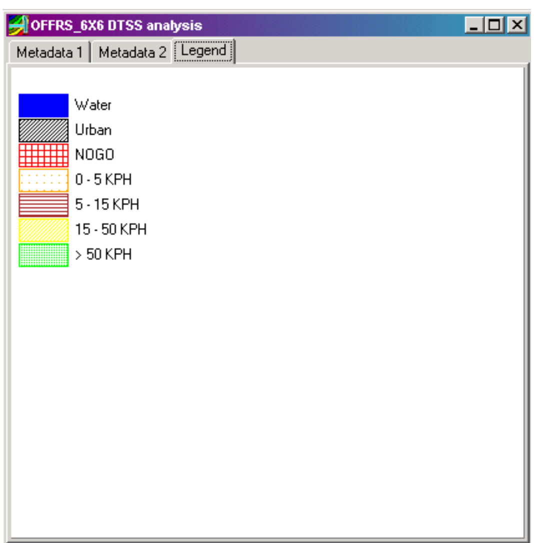
To display your Digital Overlay Product in a new window click the <DTSS> button → 

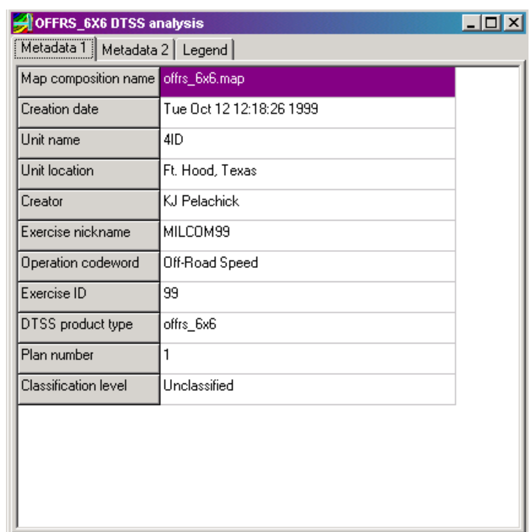
This will bring up the Open DTSSOP product window.



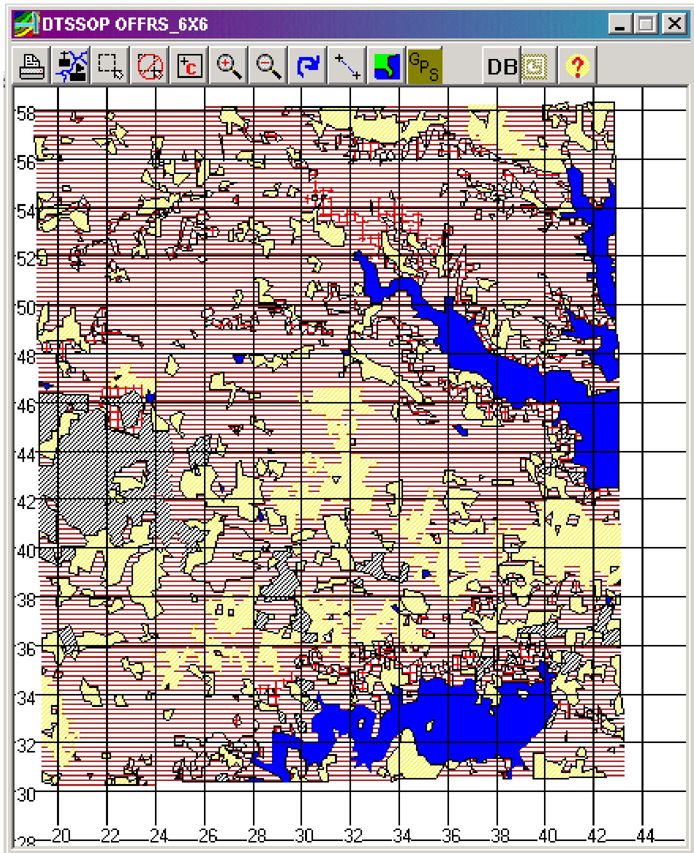
Select the desired (.DTSS) file and click on the <OPEN> button →

The Metadata and Legend for your DOP will be displayed in one window with each being selectable by its own tab.





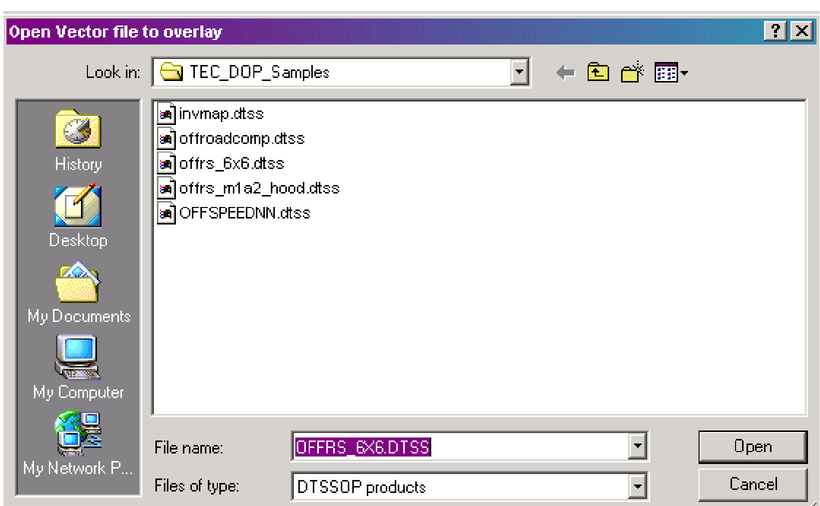
The DOP will be displayed in a separate window as shown below.



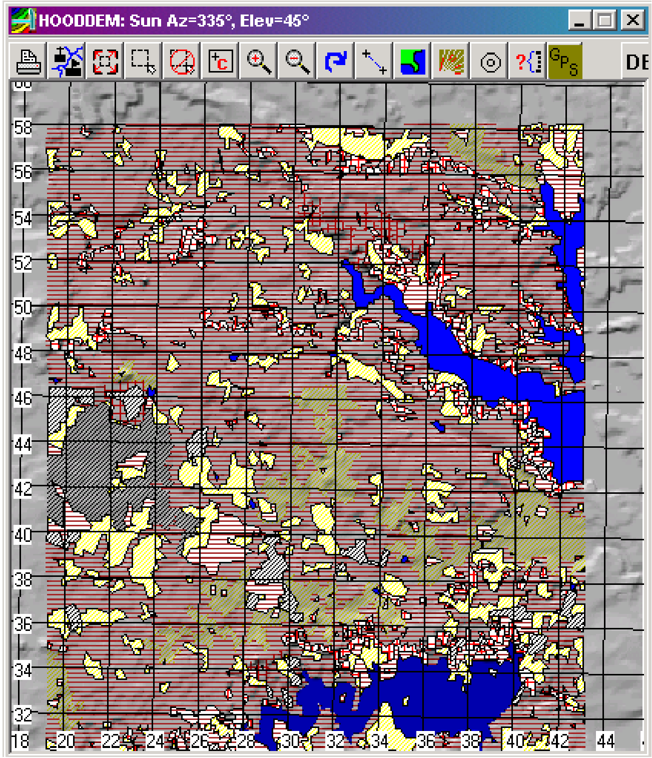
The DOP display showing Off Road Speed Analysis. See the Legend on the previous page.

Display the DOP as an Overlay

Digital Overlay Products may be displayed over elevation, imagery or map backgrounds.
After you have loaded your background display data you may overlay your DOP by selecting the <u>OVERLAY</u> and <u>VECTOR OUTLINES</u> function at the main menu. This will bring up the <u>Open Vector file to overlay window</u>.



Here you will need to set your Files of type to DTSSOP products then navigate to and select the desired DOP overlay.



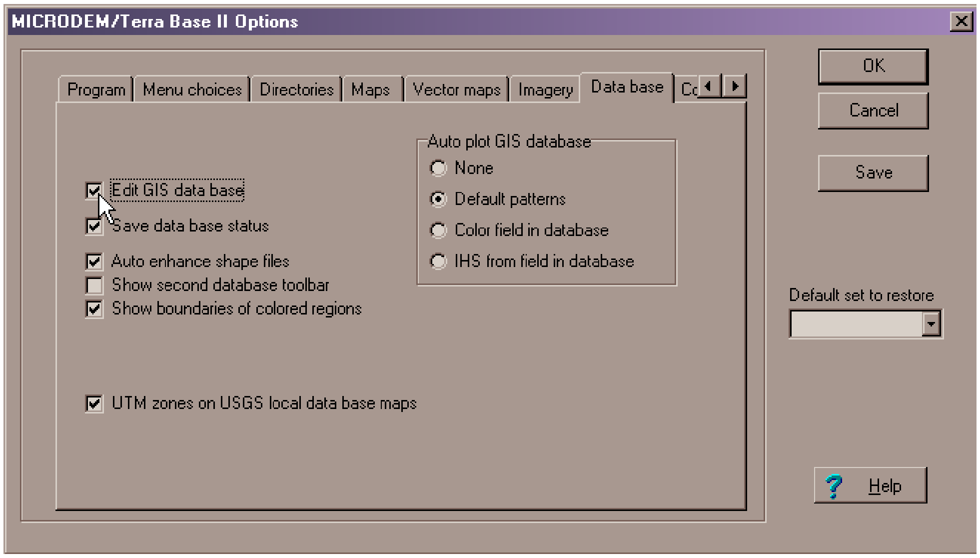
Here we have displayed our elevation data for our AOI with the DOP overlay.

Editing Shapefiles, Adding and Deleting Fields and Records

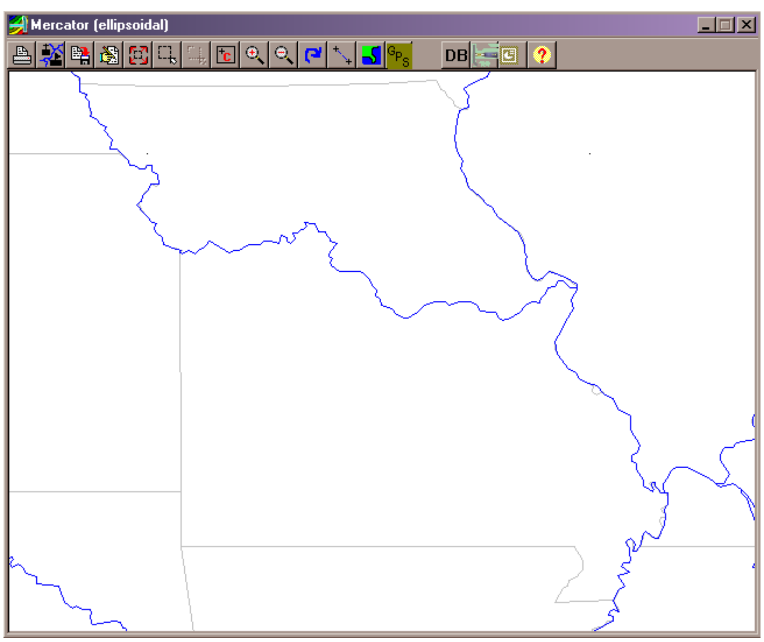
You may now edit your shape files to add, delete or move points, lines and polygonal features.

Note this functionality is experimental you should always backup your files and operate on a copy of your shape files.

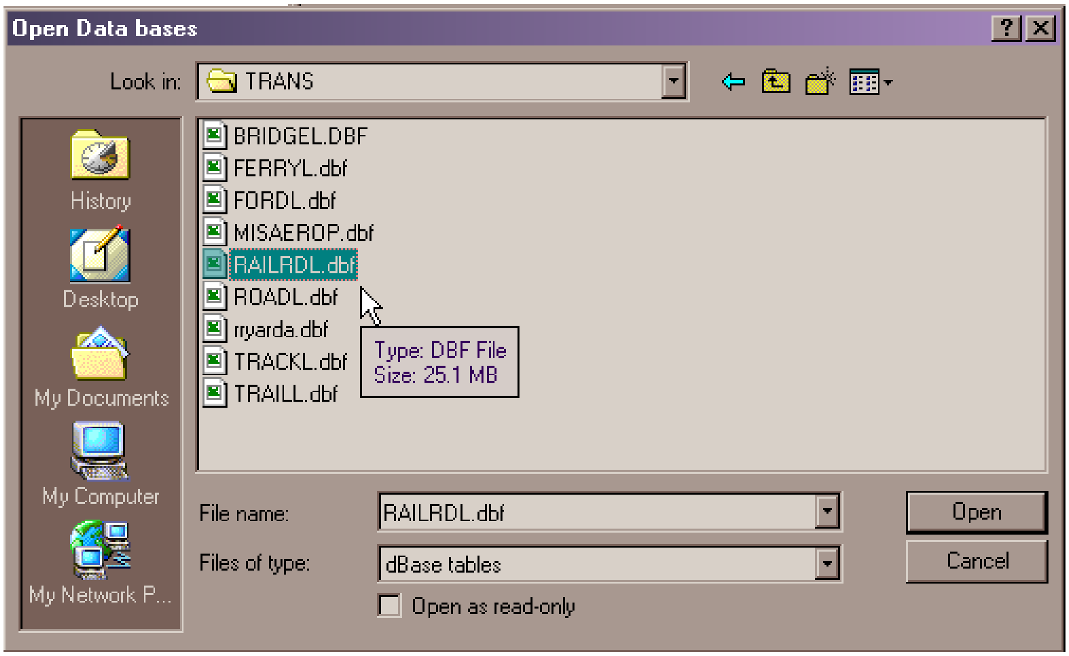
Insure that database edits are enabled (Database tab of the options form).



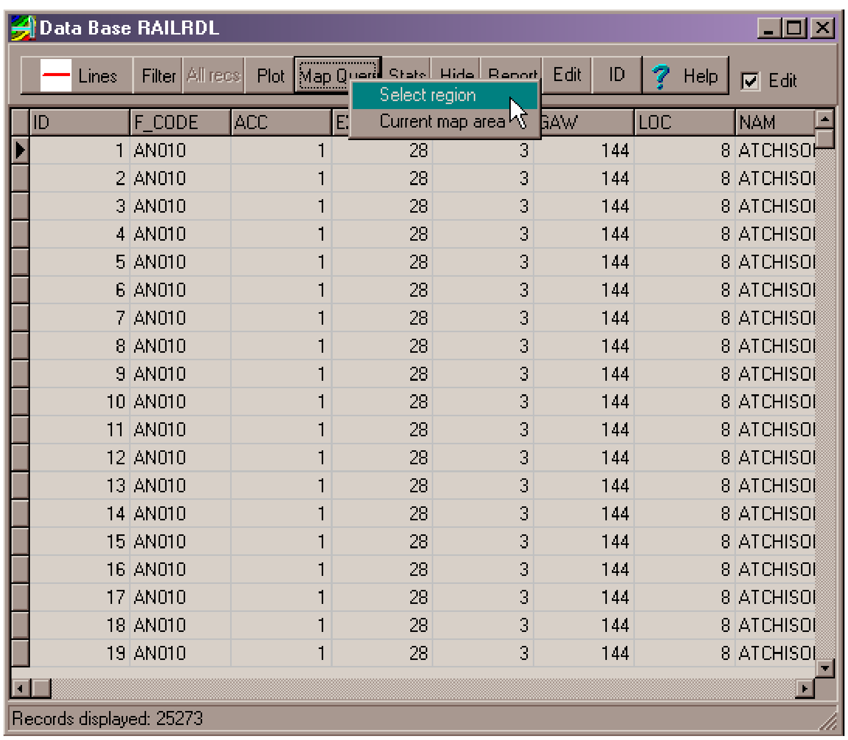
Open the map to use for graphical edits. Here we have opened the World Vector Map and subset-zoomed to our local area.



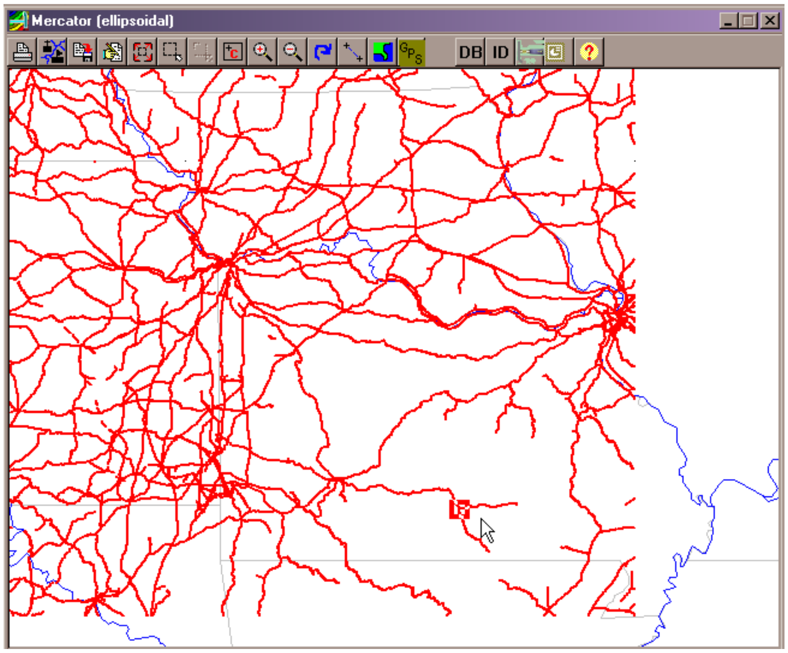
Open the shapefile with the Database menu option or the DB button on the toolbar → 



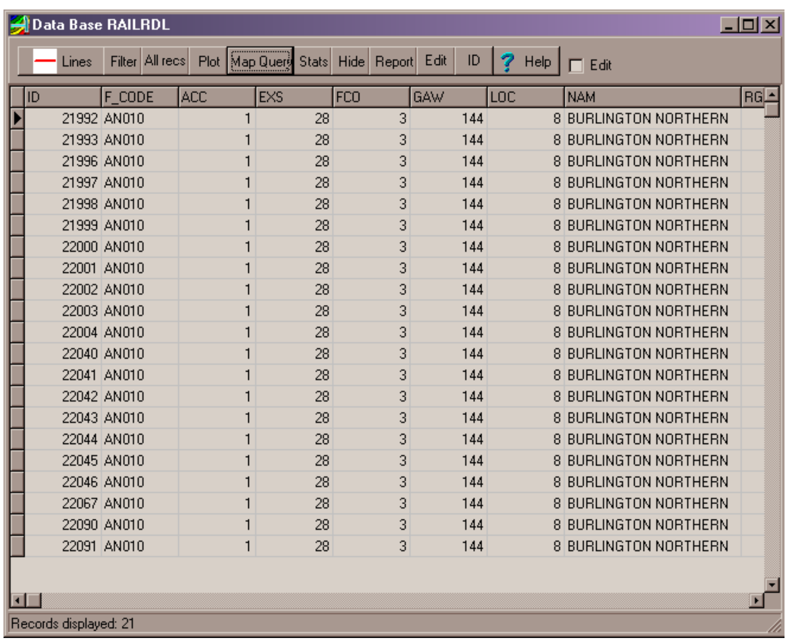
This will bring up the Open Database dialog where you will navigate to and select the desired shapefile's dBase (.dbf) file to be edited.



We need to select the desired section of the file we plan to work on by selecting Map Query and Select Region from the Data Base menu.



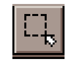
Here we have selected a small area of the database to work with. The matching records are now displayed in the DataBase RailRDL window.

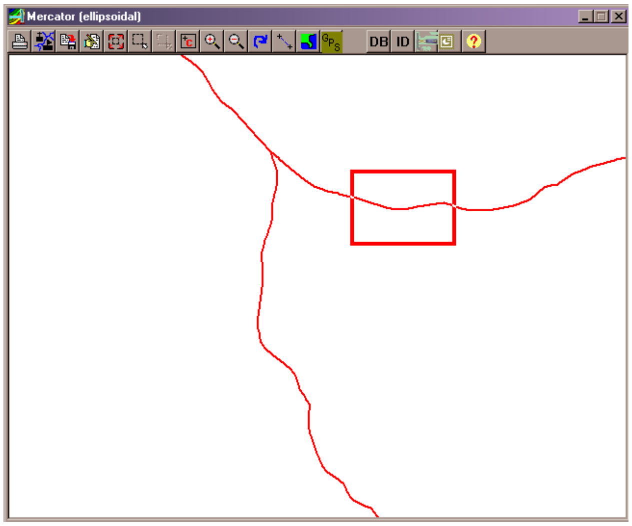


ID	F_CODE	ACC	EXS	FCO	GAW	LOC	NAM	RG
21992	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
21993	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
21996	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
21997	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
21998	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
21999	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22000	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22001	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22002	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22003	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22004	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22040	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22041	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22042	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22043	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22044	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22045	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22046	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22067	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22090	AN010	1	28	3	144	8	BURLINGTON NORTHERN	
22091	AN010	1	28	3	144	8	BURLINGTON NORTHERN	

Records displayed: 21

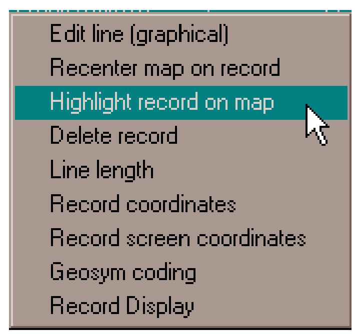
Zoom into the area by selecting the <Subset & Zoom> button from the displays button bar →

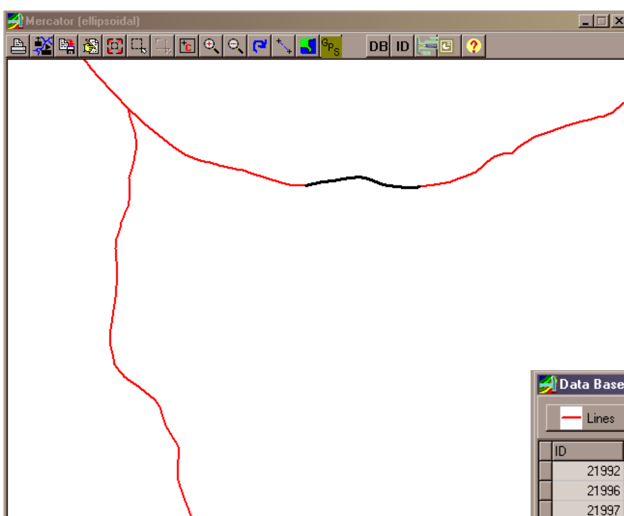




Use the <Map Query> button to select the specific records associated with the area you plan to edit. Here we see the detail of the region we have selected. From the list of currently displayed records. To verify which segment/feature is associated with a specific record you can double-click on the desired record and select

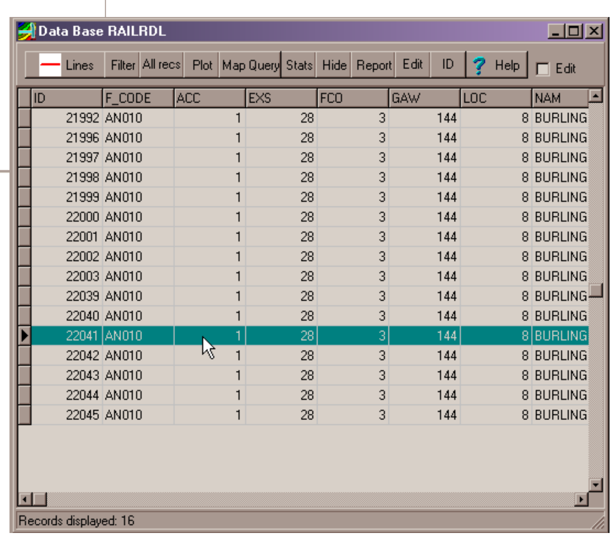
<ins>Highlight Record On Map</ins> from the menu →





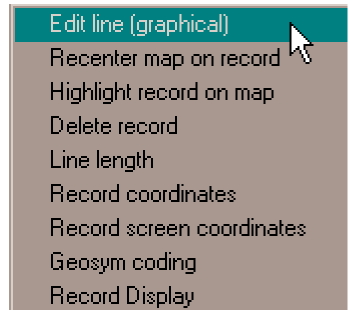
This is the record associated with the line

segment in black →

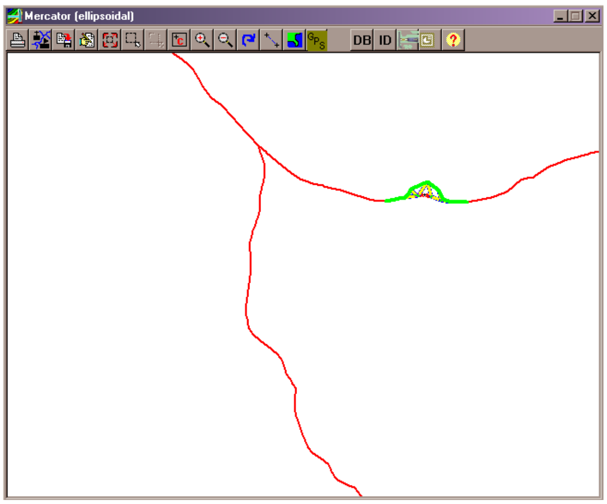


ID	F_CODE	ACC	EXS	FCO	GAW	LOC	NAM
21992	AN010	1	28	3	144	8	BURLING
21996	AN010	1	28	3	144	8	BURLING
21997	AN010	1	28	3	144	8	BURLING
21998	AN010	1	28	3	144	8	BURLING
21999	AN010	1	28	3	144	8	BURLING
22000	AN010	1	28	3	144	8	BURLING
22001	AN010	1	28	3	144	8	BURLING
22002	AN010	1	28	3	144	8	BURLING
22003	AN010	1	28	3	144	8	BURLING
22039	AN010	1	28	3	144	8	BURLING
22040	AN010	1	28	3	144	8	BURLING
22041	AN010	1	28	3	144	8	BURLING
22042	AN010	1	28	3	144	8	BURLING
22043	AN010	1	28	3	144	8	BURLING
22044	AN010	1	28	3	144	8	BURLING
22045	AN010	1	28	3	144	8	BURLING

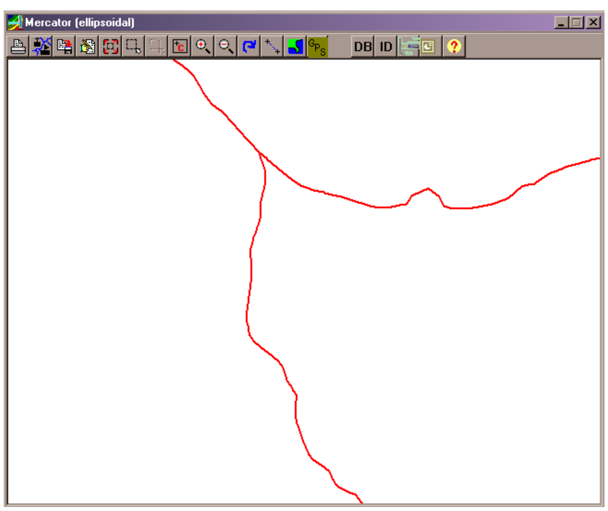
Double click on the record for the line segment/specific feature to be edited and select Edit Line (Graphical) from the menu.→



.



You may adjust the line/outline by clicking on the line and dragging it to a new position.



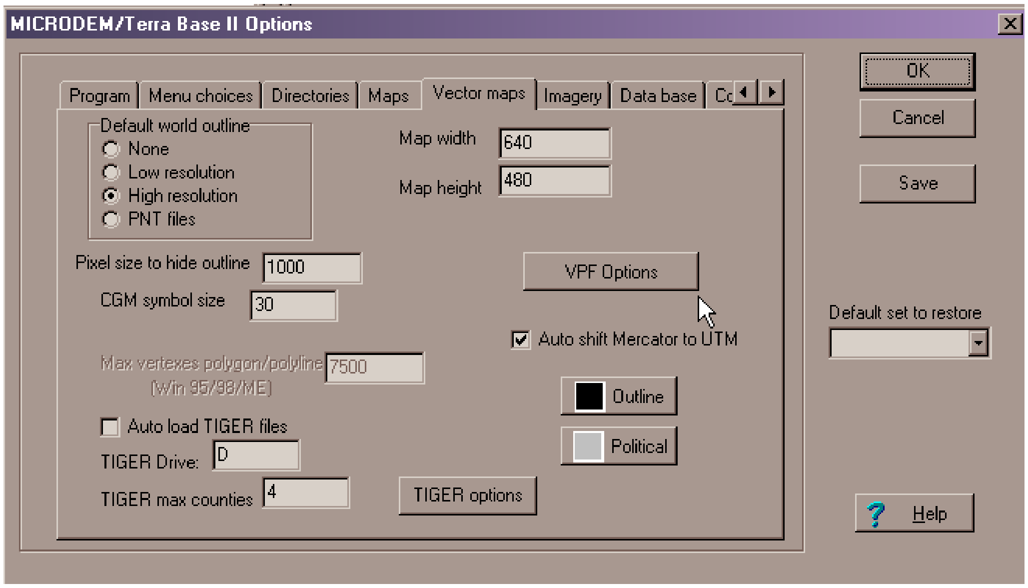
Use the <SaveEdits> button to save the new line. →

The changes will not be saved until you do this; you must save every record individually.

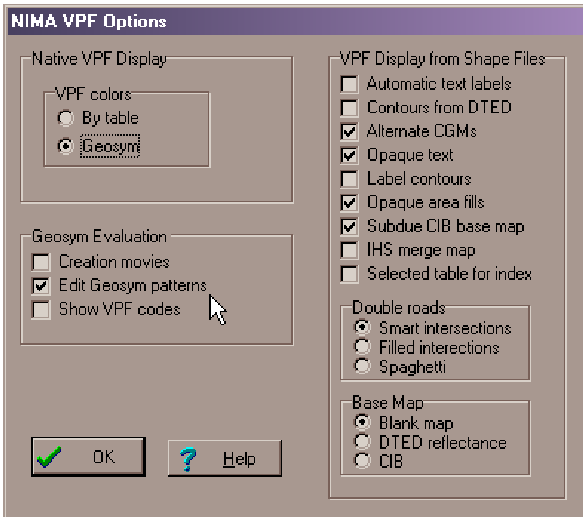
The GeoSym Editor

Notes: VPF data and NIMA Country Data may be displayed using the prototype GeoSym map symbology. Both VPF and NIMA Country Data must be imported in order to utilize GeoSym symbology. Windows 95/98/ME operating systems do not support GeoSym. GeoSym symbology may be utilized with shapefiles displayed using the OVERLAY/VECTOR OUTLINES, dBase files displayed with the DATABASE menu functions and with the <VPF> button graphical and keyboard selection methods. See the related sections of **Chapter 9** which discuss these display methods.

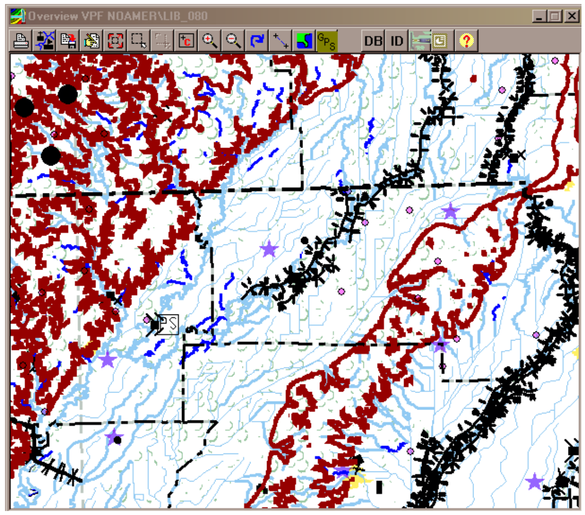
You may alter existing GeoSym point, line and area patterns and save them as Alternate GeoSym patterns for use in your map displays.



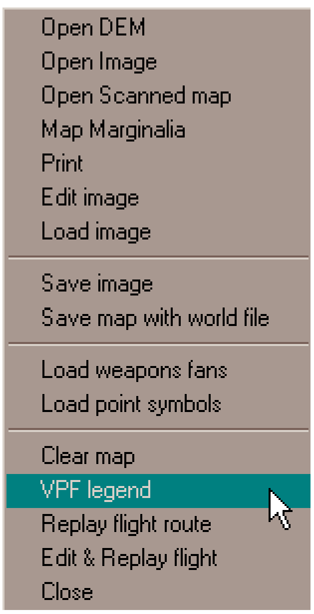
To enable the Geosym Editor go to OPTIONS, select the VECTOR MAPS tab, select the <VPF OPTIONS> button.



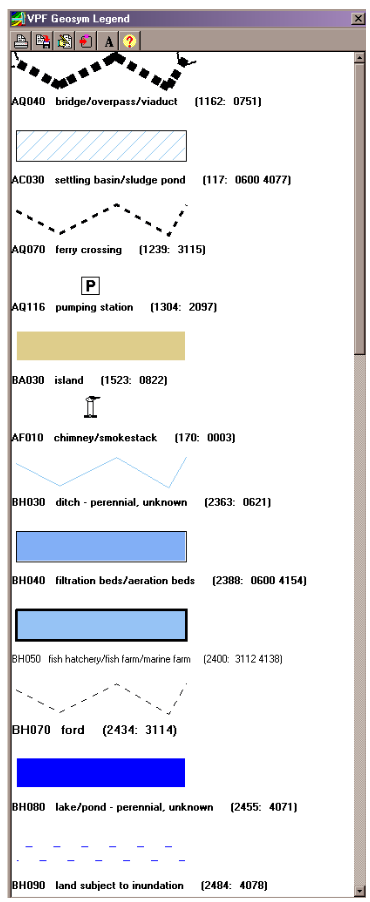
This will bring up the NIMA VPF Options Dialog where you will check the Edit Geogsym Patterns options box. Make sure you have also selected to display your data with Geosym by selecting Geosym under VPF Colors at the top left of the dialog box. Click on <OK> to close the dialog window and continue.



Display you selected data set . Here we have displayed and subset-zoomed to a small section of Vmap1 for Missouri.

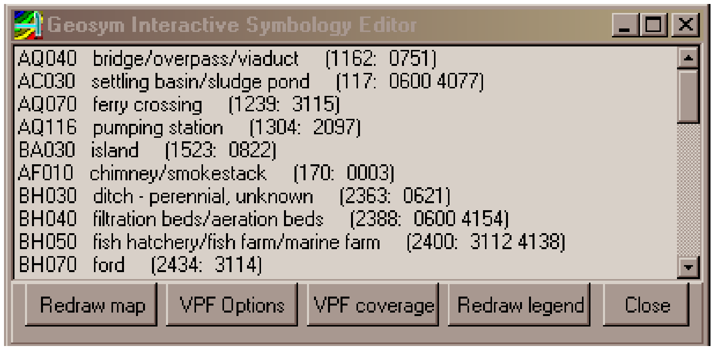


Next we will display the VPF Geosym Legend by ← selecting FILE/VPF LEGEND from the main menu.

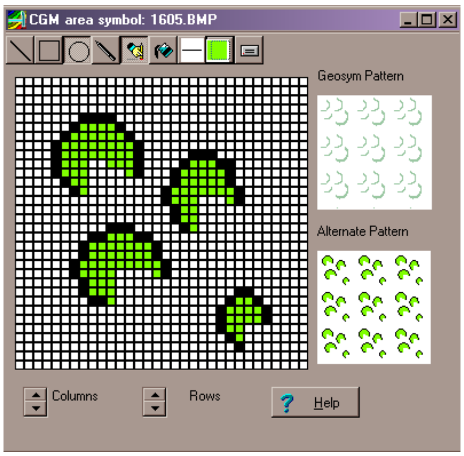


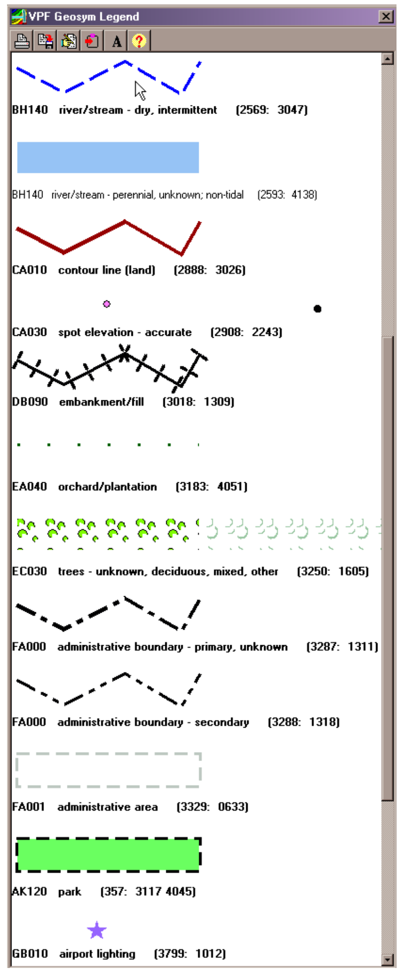
This brings up the VPF Geosym Legend →

… and the Geosym Interactive Symbology Editor dialog →



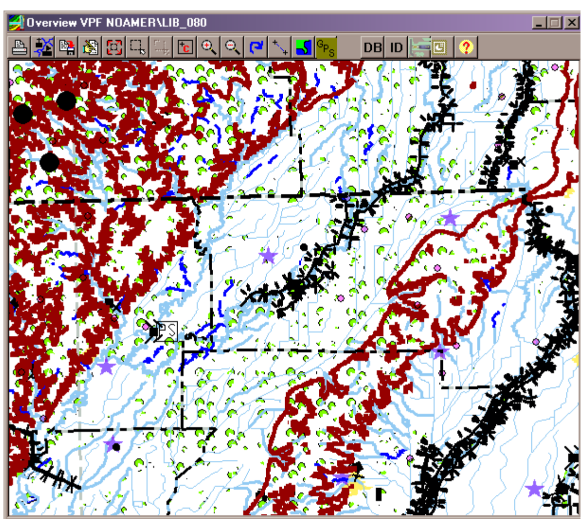
Select the desired pattern you wish to edit in the Geosym Interactive Symbology Editor dialog.





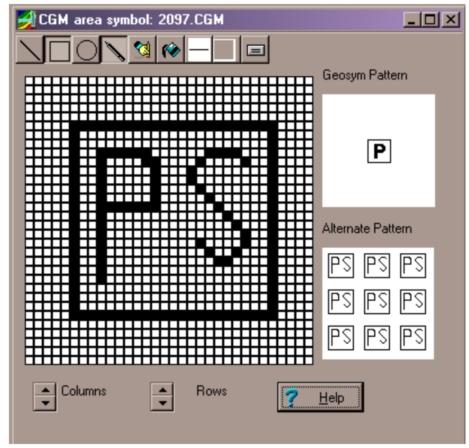
This will bring up the editor for the selected pattern. Here we have edited the area pattern for FAC EC030 Trees – unknown, deciduous, mixed, other.

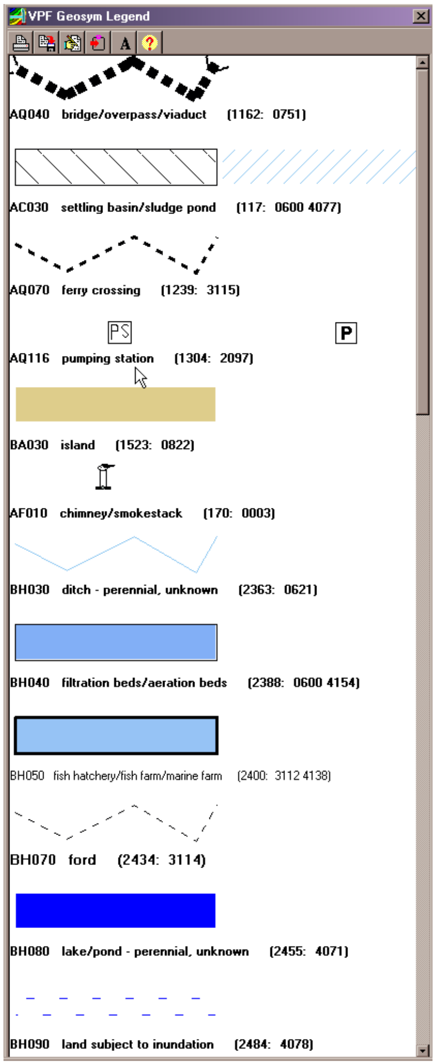
After you have saved your pattern it will be displayed as the new alternate pattern in the VPF Legend →



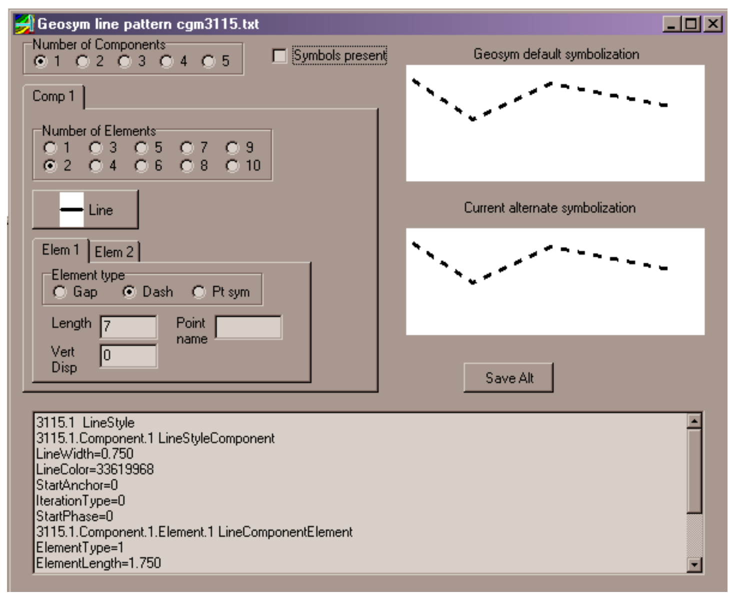
Here we have redisplayed our data with the new alternate pattern.

If you selected a point pattern to edit you will utilize a similar editor to create your new alternate pattern. **NOTE** the pattern will be shown as a repeating tiled pattern in the lower right corner of the editor, but in reality only a single tile will be used to produce the pattern as seen in the VPF Geosym Legend below. →





The editor for a line pattern will look like this.



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If you plan to experiment with alternate Geosym symbolization you should pay close attention to how the new patterns display at various scales/zoom levels. A sparse pattern may not properly fill small areas at large scale.

Addendum to User's Guide for MicroDEM 6.03

There are thirty-four new functions or significant changes to MicroDEM/TBII ver 6.03 which require your awareness. Changes were made as an 'Addendum' rather than to the body of the User's Guide for MicroDEM 6.0 due to publication deadlines.

NOTE: To Windows XP Users:

XP users must have their desktop set to 'CLASSIC' mode in order to utilize the 'Variable Opacity Merge' functionality discussed in page 169 of the User's Guide.

NOTE: To Users of Controlled Image Base (CIB) and Compressed Arc Digitized Raster Graphics (CADRG) Data with the 'Variable Opacity Merge' Function.

Tiled data will sometimes not break out correctly to generate the matching underlying and overlying data layers for the 'Variable Opacity Merge'. If you encounter this problem, the quick solution is to save your tiled data as a geotif and then use the geotif in the creation of the variable opacity merge. Before you create the geotif file from your display by selecting FILE /SAVE MAP AS GEOTIF you should first zoom-in so that the image quality on screen is good.

NOTE: None Responsive Controls During Processing.

If during processing you have problems getting a reaction from a button, usually when you're trying to <CANCEL> processing, simply click on the button with the mouse and then hit the <ENTER> key.

NOTE: DTSS and ERDAS Imagine Users.

When exporting imagery, elevation and map product files as .IMG or as Geotifs, for use in MicroDEM you must first reproject the data to UTM.

NOTE: Very Large 3D Views.

Very large image drapes, which cover multiple UTM zones, must be performed in OpenGL rather than Oblique or Perspective Views.

NOTE: Portable Network Graphics (.PNG) files.

MicroDEM is now able to display and save images in the Portable Networks Graphics format. This new file format is in addition to the previously available .bmp, jpg and gif formats.

These files are for viewing and are not typically georeferenced; however, you can create a world file and georeference .png imagery. **See in Registering Imagery and Scanned Maps.**

NOTE: Creating Movies Using Controlled Image Base (CIB) or Compressed Arc Digitized Raster Graphics (CADRG).

When creating movies with CIB or CADRG data you should first setup and test the desired viewing parameters in a Perspective View. This will simplify setting up the same parameters for your movie.

NOTE: Pipeline Automated Planning Aid (PAPA).

The Pipeline Automated Planning Aid tool, starting on page 142 of the User's Guide, no longer has its own icon in the MicroDEM/TBII start group nor a 'Default set to restore' start up option. This tool is now only initiated using the <PL> button on the main menu GUI bar.

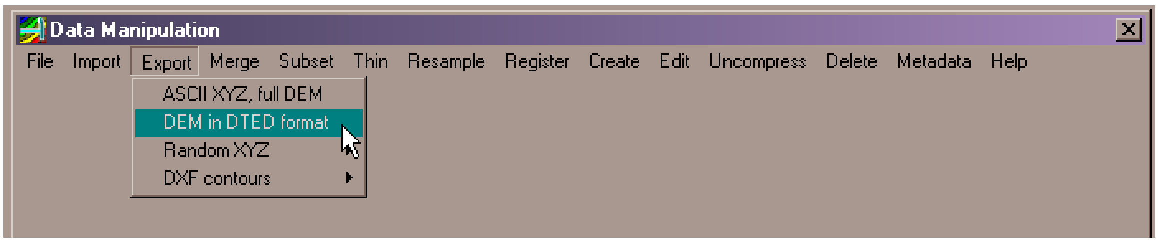
NOTE: Blue Marble Datasets.

Blue Marble Data, starting on page 54 of the User's Guide, is now available as easier to use 250Mb tiled, compressed files. GLOBE 1Km DEM data is also available. These may be downloaded from the www.globe.unibuc.ro website. The two Blue Marble files when uncompressed require about 750Mb storage space.

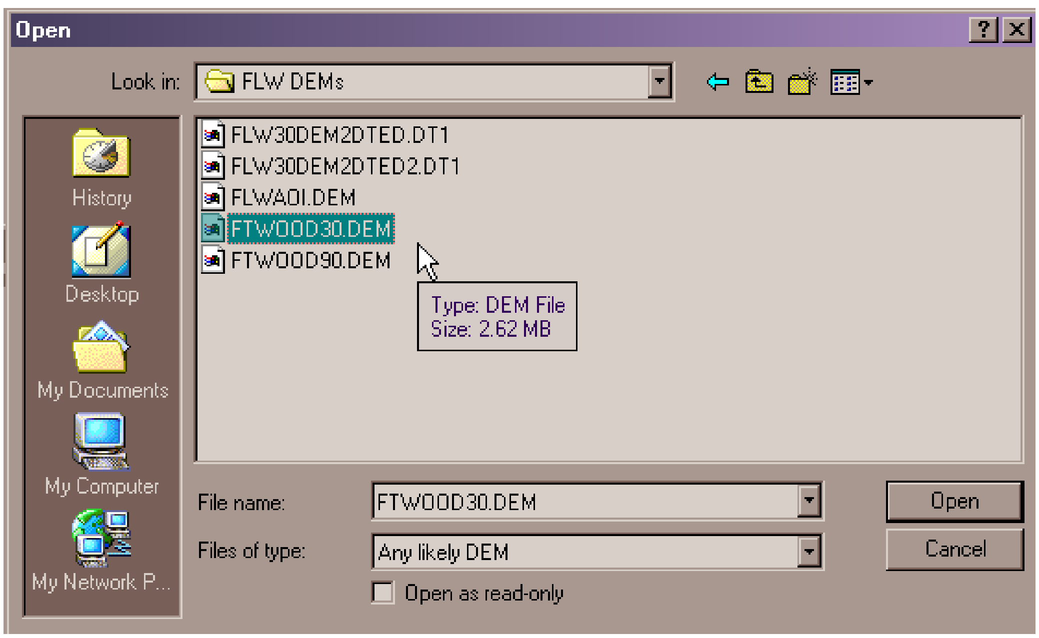
Exporting Elevation Data To Padded DTED 1 or DTED 2 One Degree Cells.

Although MicroDEM will work with DTED 1 and DTED 2 data in sizes smaller than 1 full degree; many other GIS packages such as ERDAS Imagine require that the data cover a full 1 degree cell per the MIL-SPEC.

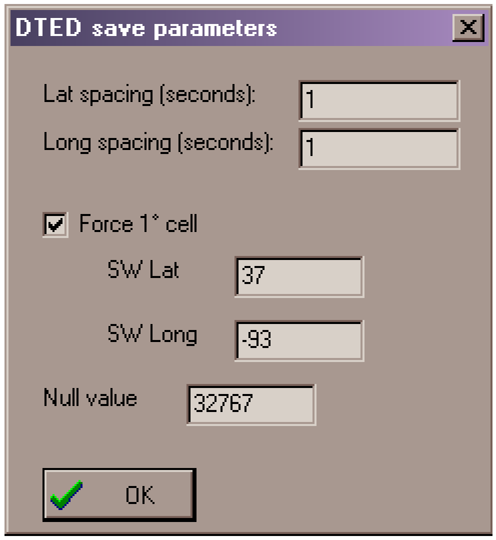
At the main menu select FILE / DATA MANIPULATION to bring up the Data Manipulation window. Next select EXPORT / DEM IN DTED FORMAT.



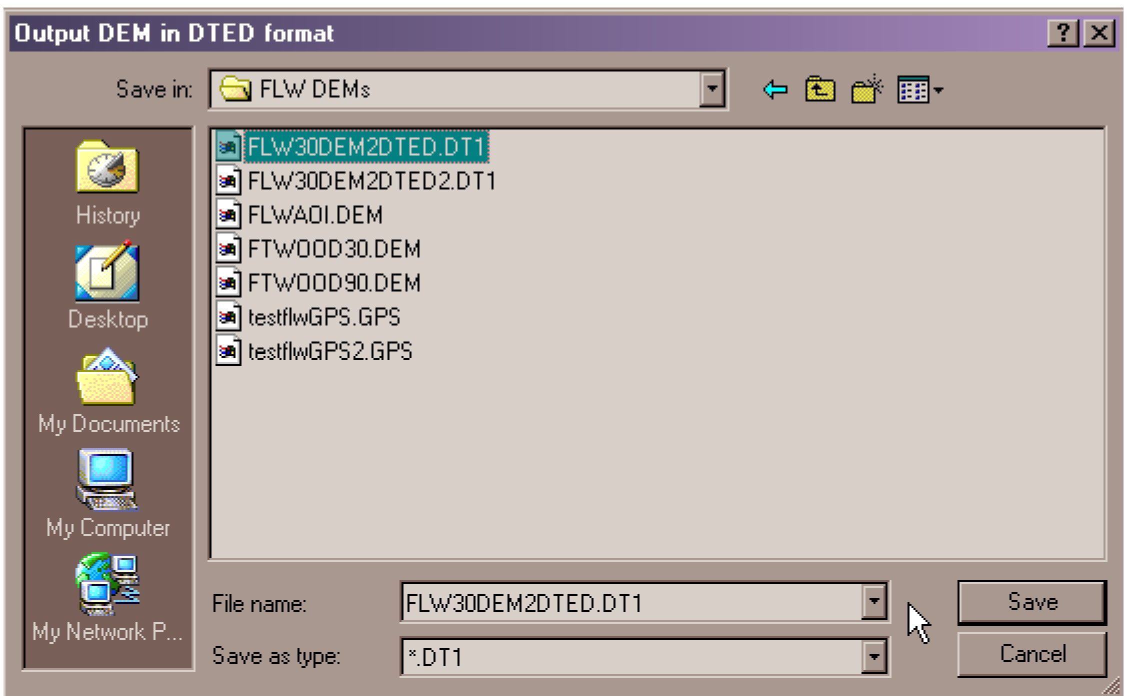
This will bring up the OPEN window where you will navigate to the location and enter the name of the DEM file you wish to convert to DTED.



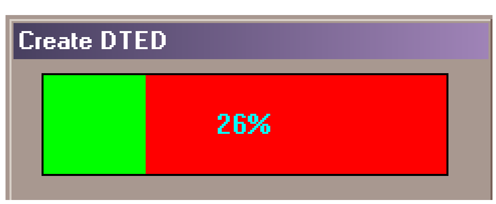
This will open the DTED SAVE PARAMETERS window.



Here you will enter the lat and long spacing in arc seconds. Remember that DTED Level 1 data spacing equals 3 arc seconds and that DTED Level 2 data spacing equals 1 arc second. If you plan to use the exported DTED with other GIS packages you must check the 'FORCE 1 Degree Cell' box. The default null value is zero; however some GIS software packages require other null values and you may have to experiment. Clicking the <OK> button will close the DTED SAVE PARAMETERS window and open the OUTPUT DEM IN DTED FORMAT window.

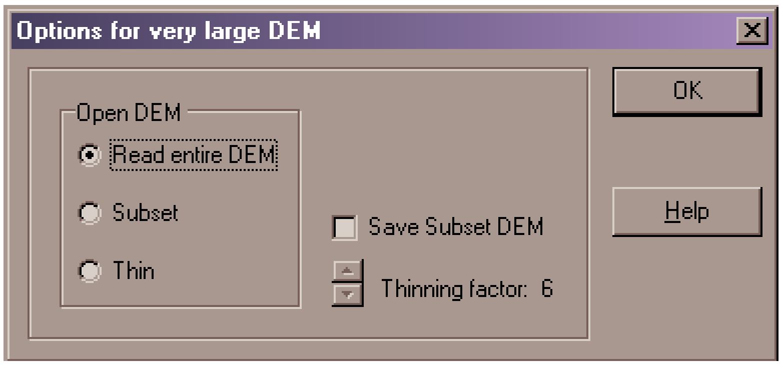


After entering the name for the output DTED file name you will be presented with a CREATE DTED progress bar.



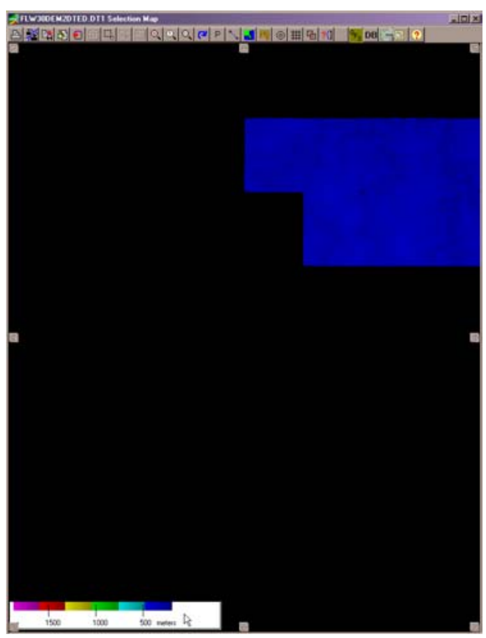
After the progress bar closes, another 'OPEN' window will appear allowing you to process another file. If you do not wish to process another file simply click on the <CANCEL> button to close the Open window and then select FILE / CLOSE to close the Data Manipulation window.

After the DEM file has been exported to DTED format you can reload the data as you would any other DTED file. At the main menu select FILE / OPEN DEM. If you are loading DTED Level 1 data it will simply be displayed as expected. If however you are loading DTED Level 2 this will bring up the OPTIONS FOR VERY LARGE DEM window.



Here you are presented with several options for displaying your DTED.

The display (below) shows the Fort Leonard Wood DEM data (blue) and the surrounding padded data (black) with null values. Note that all the 'real' data is displayed as a single blue tint, this is due to the elevation range being stretched from the null value to the end of the real data range. Once you zoom into the actual data you may correct the elevation tint display range by right clicking in the display and selecting ELEVATION COLORS / EXPAND COLOR RANGE.

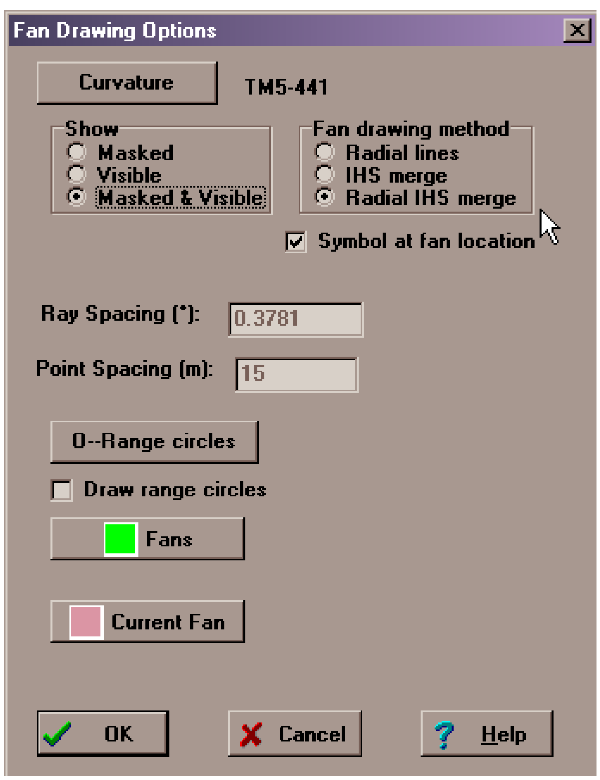


The DTED 2 padded 1 degree cell exported from a smaller 30 meter DEM file.

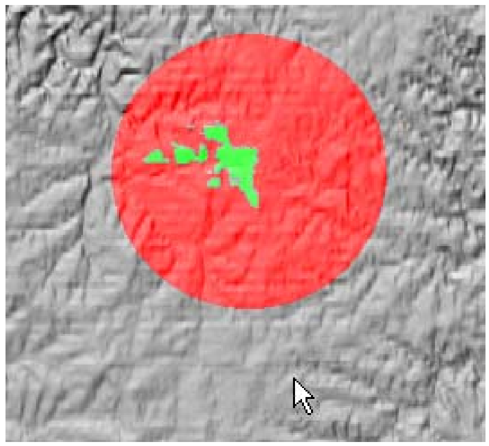
New Radial I.H.S Weapons Fans.

There are now three types of weapons fans that you can create in MicroDEM. After you have loaded your elevation file and any imagery or map that you wish to use as a background for your weapons fans, select OVERLAY / WEAPONS FAN from the main menu then double click on your display at the position for the center point for your weapons fan. This will bring up the ‘Weapons Fan Parameters’ window.

Click on the <FAN COLOR OPTIONS> button to open the ‘Fan Drawing Options’ window.



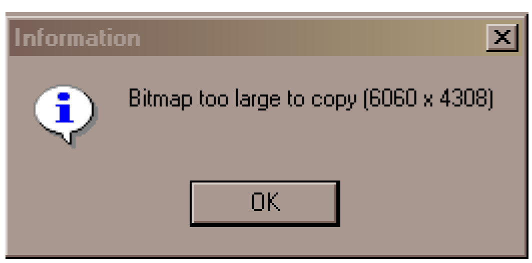
As you can see you now have three options for the fan drawing method: RADIAL LINES, I.H.S MERGE and RADIAL I.H.S MERGE. Select RADIAL I.H.S MERGE then click the <OK> button to close the 'Fan Drawing Options' window. Next click on the <OK> button to close the 'Weapons Fan Parameters' window and draw the weapons fan on your display.



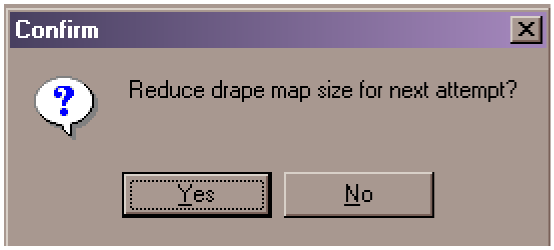
The RADIAL I.H.S MERGE weapons fan with 'masked' areas displayed in red and 'visible' areas displayed in green.

BITMAP TOO LARGE Popup

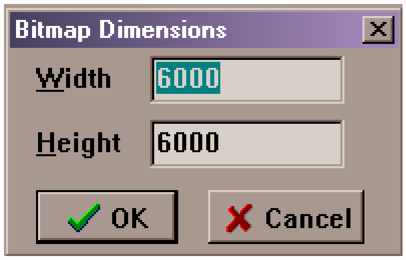
During creation of 3D Oblique and Perspective Views, if you are using high resolution data such as imagery, you have your OPTIONS / VIEWS /MAX SIZE DRAPES X DIMENSION and MAX SIZE DRAPES Y DIMENSION set to too high a value and you are attempting to display a very large area you will see a 'Bitmap Too Large' popup window.



You will be offered the chance to reduce the values for your Max Size Drapes X and Y Dimensions to a lesser value. The default setting for these parameters is 2000 pixels per axis and the maximum setting is 6000 pixels per axis.



Selecting the <YES> button will bring up the 'Bitmap Dimensions' window.



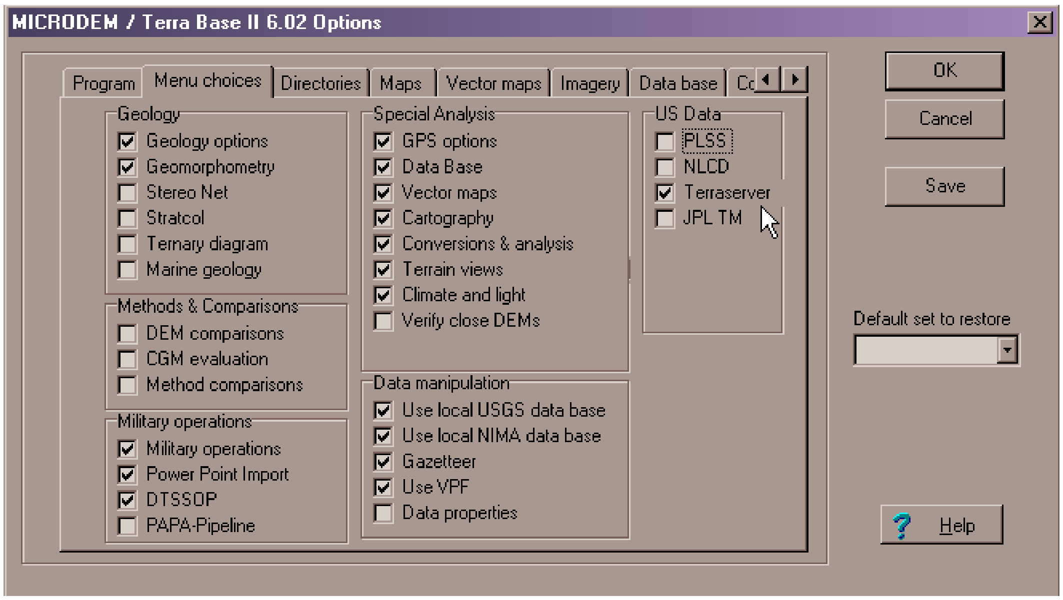
After reducing the values for Width and Height you will have to repeat the steps necessary to generate the 3D product which caused the initial error.

This new popup serves the same purpose as the OPTIONS / VIEWS / MAX SIZE DRAPES X DIMENSION and MAX SIZE DRAPES Y DIMENSION entries from the main menu.

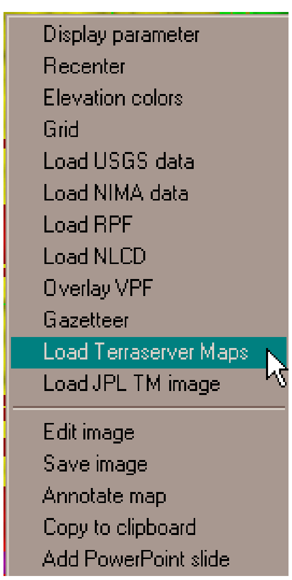
TerraServer Digital Ortho Photo Quads and Digitized Raster Graphics.

If you are working with CONUS data and you have an active Internet connection you can quickly download DOQ imagery or DRG maps of your area by simply right clicking on the center point for your area of interest on your display.

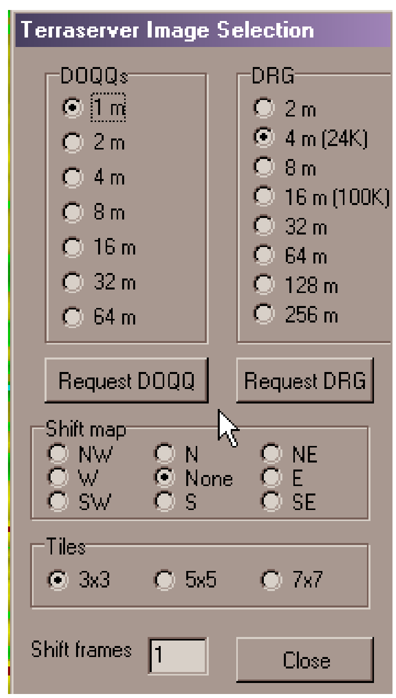
Make sure you have already checked the Terraserver box under the 'US Data' section of the OPTIONS / MENU CHOICES.



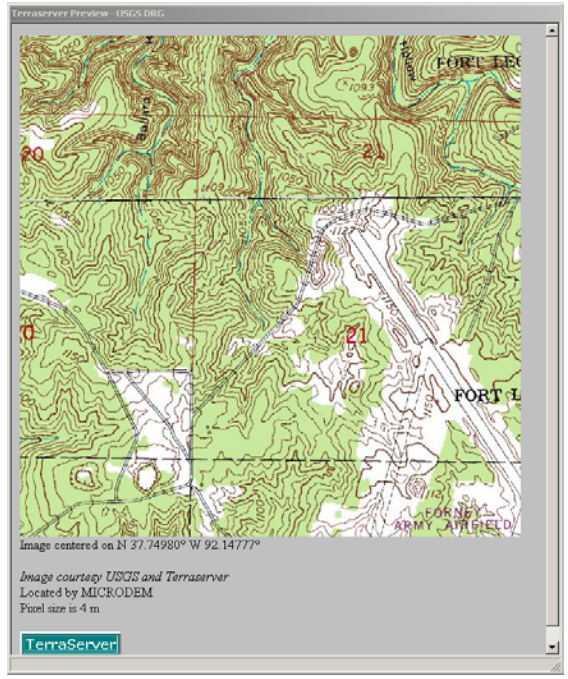
Once you right click on your display this will bring up the menu where you select LOAD TERRASERVER MAPS.



→



This in turn will bring up the ‘Terraserver Image Selection’ interface. Here you will select the desired scale and tile size for your image or map. After selecting the desired scale simply click on the <REQUEST DOQQ> or <REQUEST DRG> buttons.

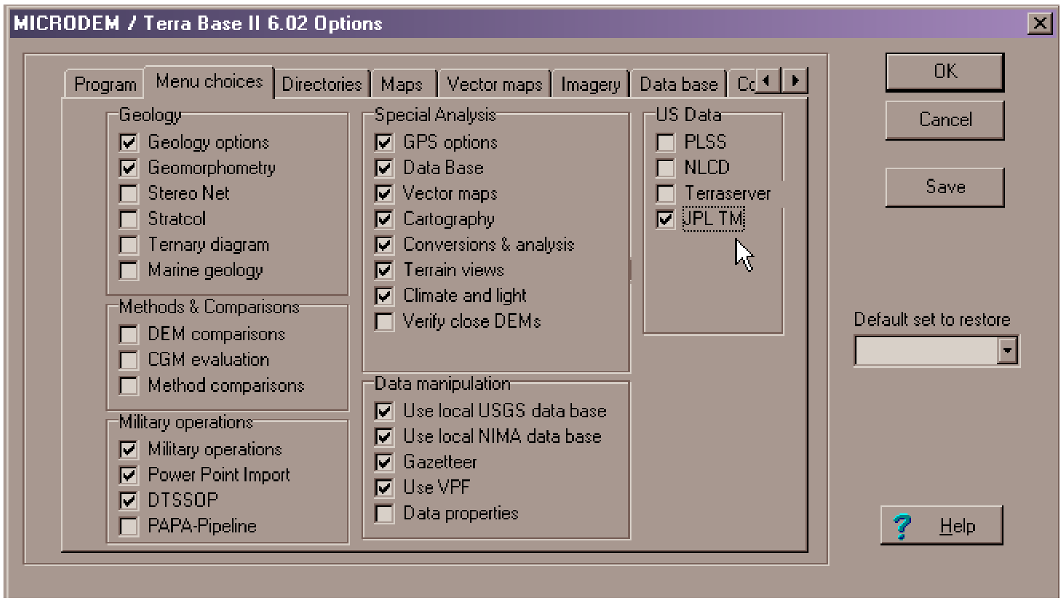


The image or map tiles for your area of interest will then be displayed.
Note that these images and maps are for visual reference only and cannot be used for analysis.

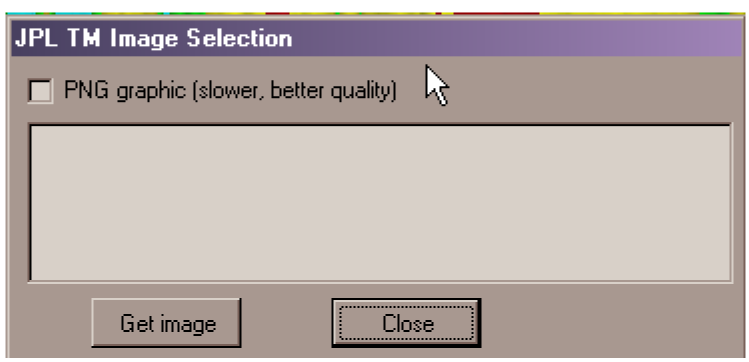
Jet Propulsion Laboratory Landsat Thematic Mapper Imagery.

If your are working with CONUS data and you have an active Internet connection you can quickly download Landsat Thematic Mapper imagery of your area by simply right clicking on the center point for your area of interest on your display.

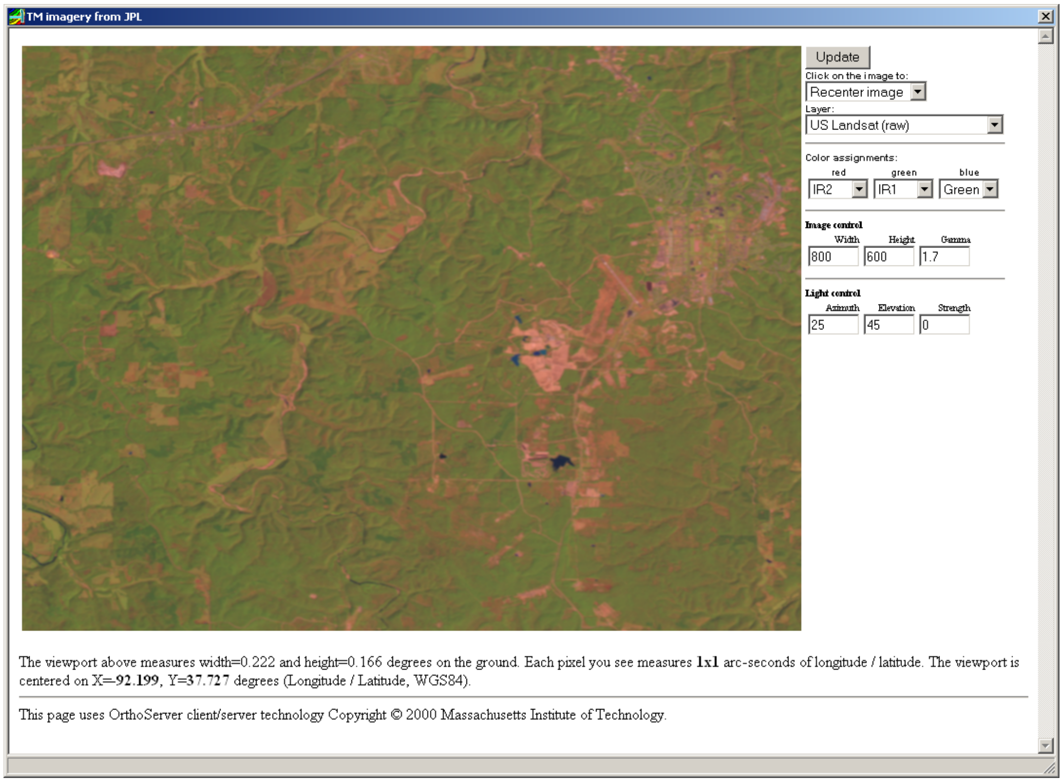
Make sure you have already checked the JPL TM box under the 'US Data' section of the OPTIONS / MENU CHOICES.



Once you right click on your display this will bring up the menu where you select LOAD JPL TM IMAGE.

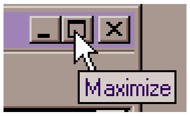


For a quick download simply click on the <GET IMAGE> button. For a better quality image first check the 'PNG graphic (slower, better quality) box and then click on the <GET IMAGE> button.

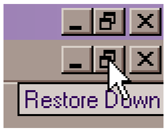


The image for your area of interest will then be displayed. Note that these images are for visual reference only and cannot be used for analysis.

Problems Maximizing and Minimizing OpenGL Displays.



If you 'Maximize' your OpenGL display, your other MicroDEM displays will also be maximized; you will therefore need to 'Restore Down' the size of all your displays using the button as shown below.



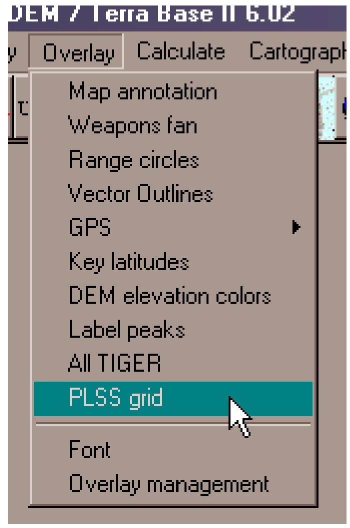
Otherwise your displays will be stacked at the top left with their title bars obscured by the Main menu GUI bar and you will not be able to move them.

Overlay Public Land Survey System (PLSS) Township and Range.

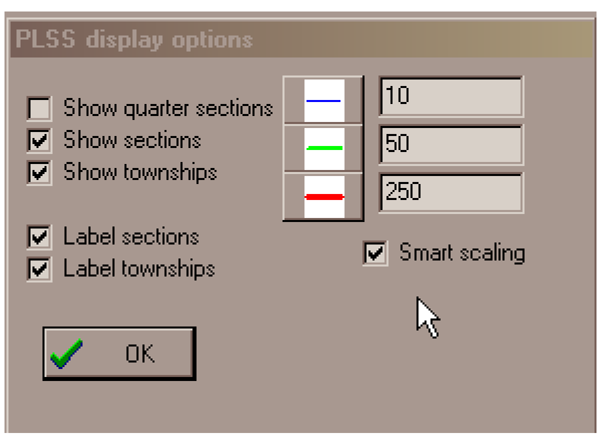
After downloading the zipped files for your Quad, County or State; you can display the PLSS Township and Range overlay for your area of interest over your background map display.

Download the necessary zipped files from http://www.geocommunicator.gov/LSI and unzip them in your ..\Mapdata\PLSS folder.

At the main menu select OVERLAY / PLSS GRID.

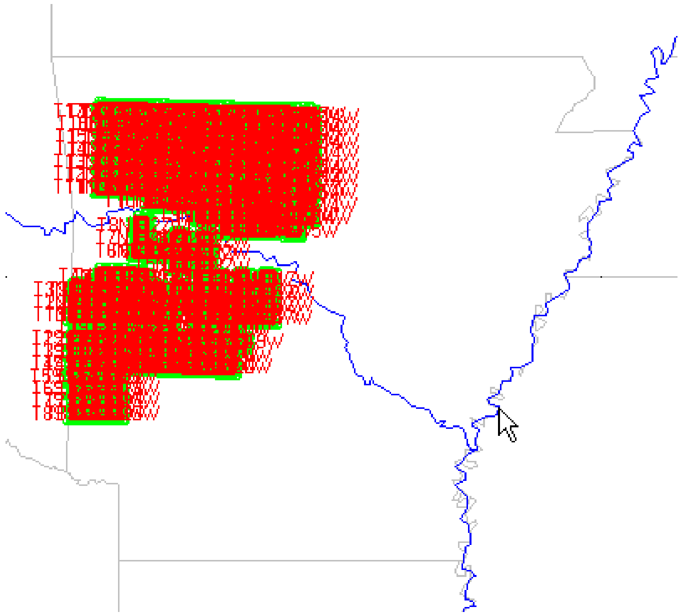


After processing the 'PLSS Display Options' interface will appear allowing you to check and uncheck the desired parameters for your PLSS display; click on the <OK> button to display your overlay.



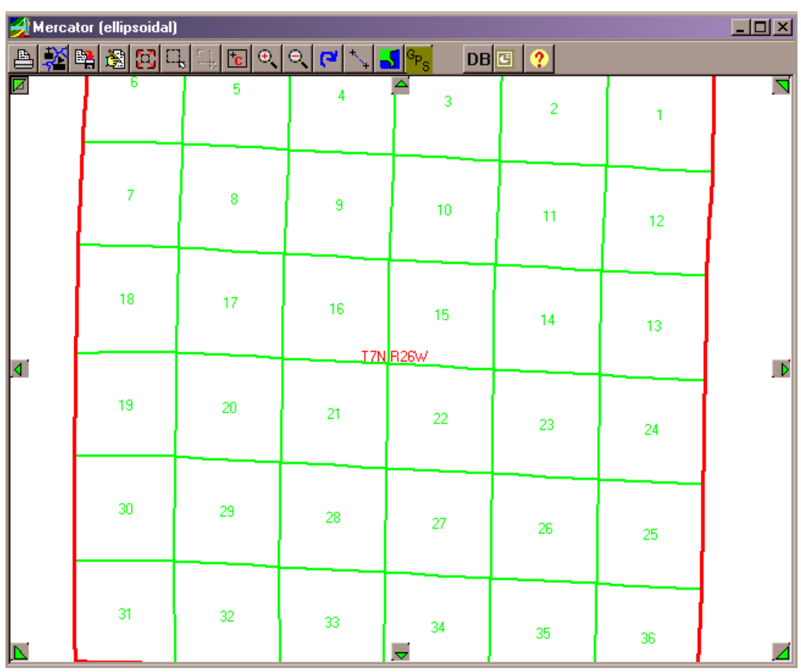
The data entry fields to the right of the line color selection buttons allow you to enter the scale that the feature will first be displayed. You may need to experiment to determine your preferences.

If you zoom-out to small scale, and have not checked the 'Smart scaling' box the display of your map may look like the following.



Here we have displayed the world vector map of Arkansas overlain with the PLSS data for the west part of the state.

Once you zoom-in, the level of detail will allow you to read the actual Township, Range, Section and Quarter.



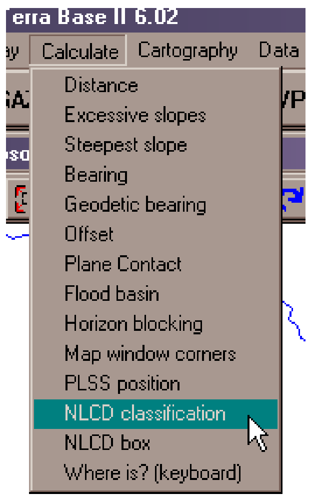
These examples were created over the Vector World Map. You may utilize this function to overlay any type of data in the United States.

Display National Land Cover Data.

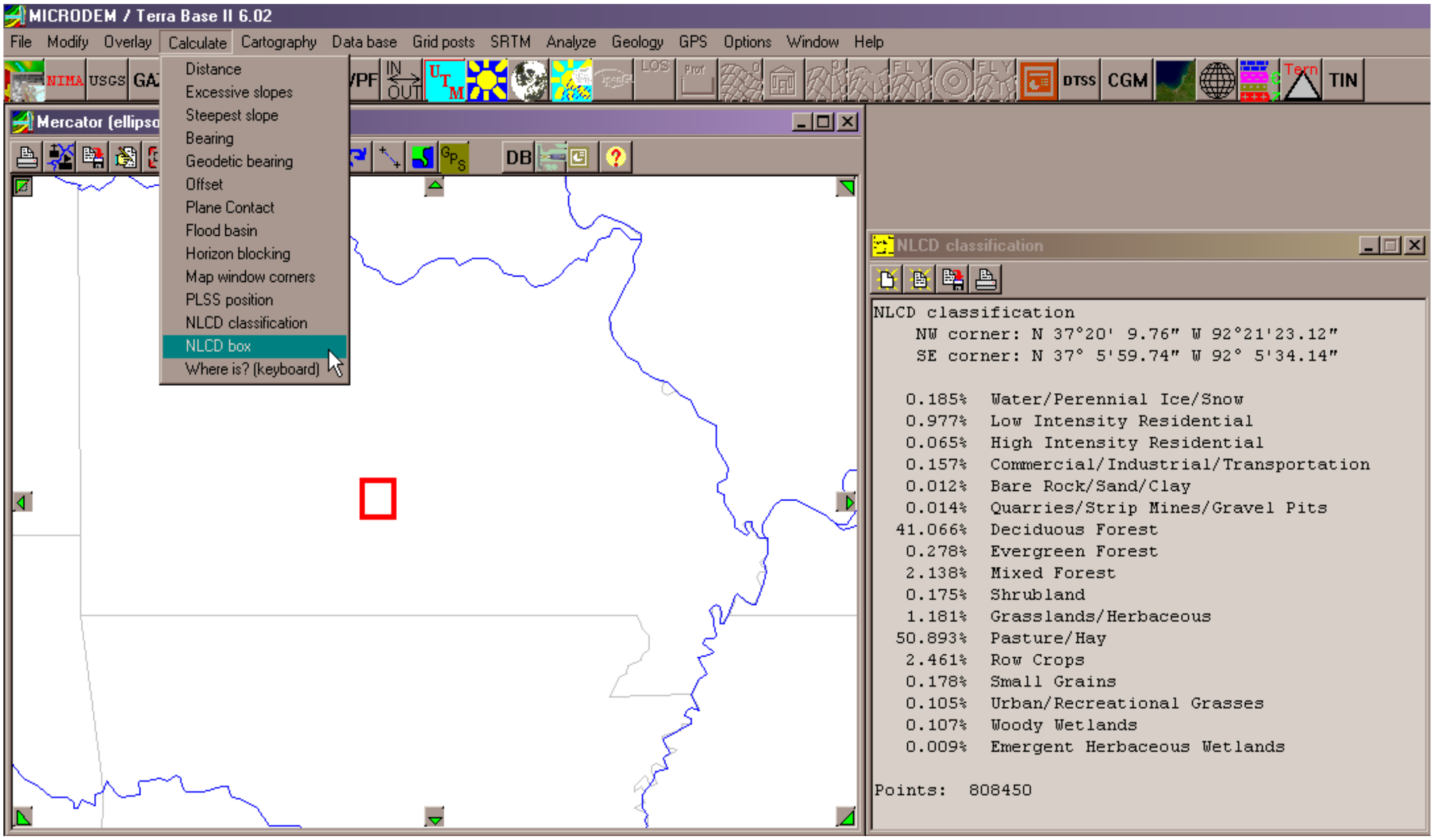
Download the National Land Cover data in geotif format for your area of interest from **http://seamless.usgs.gov** by selecting the <VIEW AND ORDER DATA SETS> button. Copy the downloaded data files into your ..\Mapdata\USGSData\NLCD folder.

After loading the background world vector map, elevation, imagery or map data for your area of interest; you can generate a continuous readout of the land cover class for the area under your mouse-pointer at the bottom right of your MicroDEM display

This is done by selecting CALCULATE / NLCD CLASSIFICATION at the main menu.



You can display all the land classification data for an area by selecting CALCULATE / NLCD BOX from the main menu and then defining the area with your mouse.



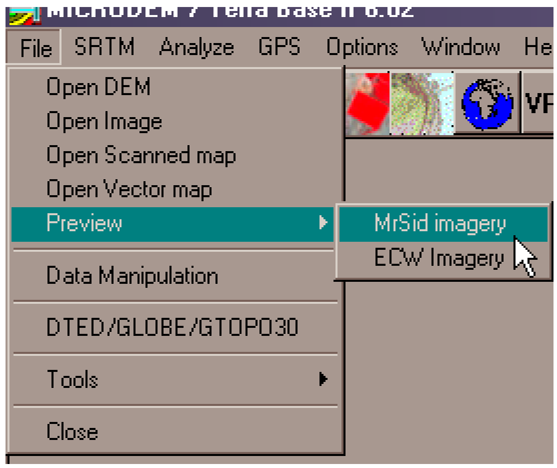
The area you selected is displayed as the red rectangle on your map display (left).
The NLCD data is displayed in a second window (right).

Active X MrSID and ECW Plugins for MicroDEM.

MrSID compressed imagery may be viewed using the Active X plugin downloaded from **http://www.lizardtech.com/solutions/geospatial** .

ECW Compressed imagery may be viewed by downloading the ActiveX plugin from **http://www.ermapper.com**.

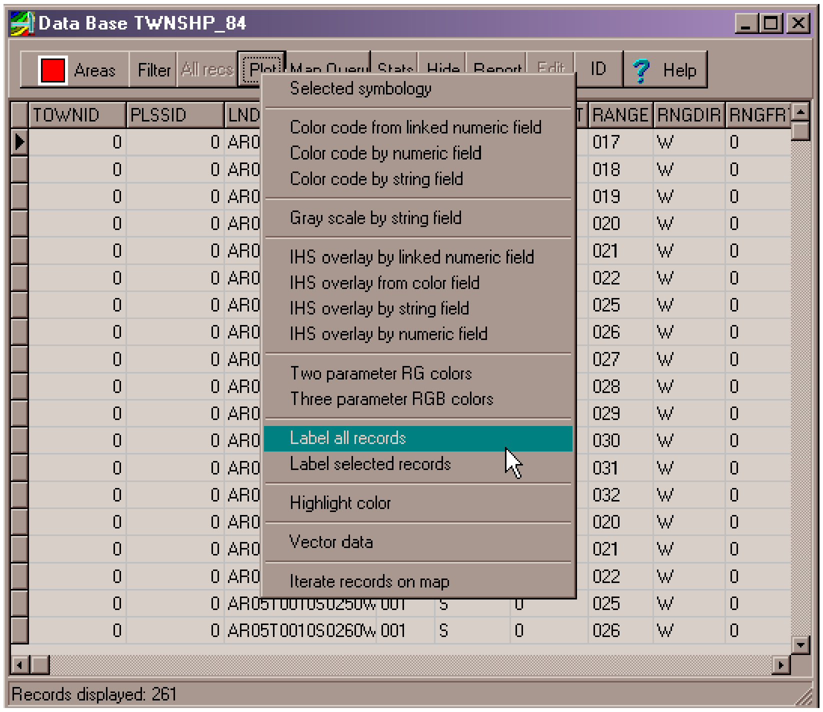
Once you've downloaded and installed the necessary files you may display MrSID and ECW imagery by selecting FILE / PREVIEW / MrSID IMAGERY or ECW IMAGERY from the main menu.



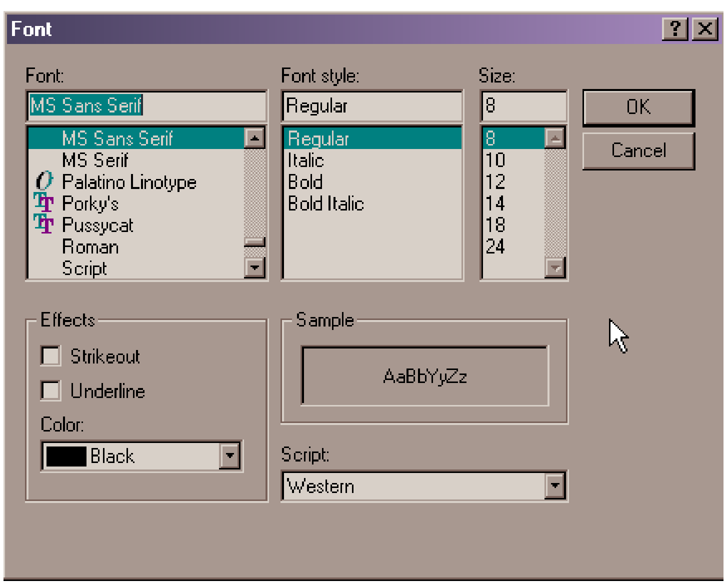
Note that these displays are for visual reference only and you may not use the imagery for analysis.

Font Control in Database Label Records Functions.

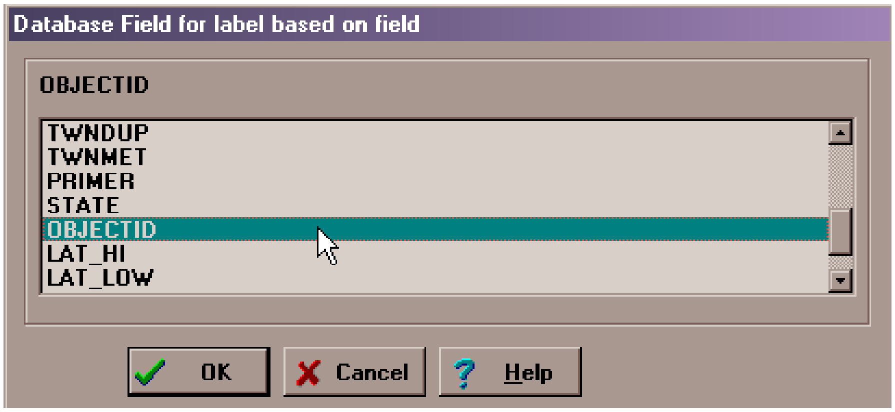
When you use the <DB> button or Database function to open a shape files (.dbf) attribute table; you now have complete control over the font type, size and color used in the PLOT / LABEL ALL RECORDS or LABEL SELECTED RECORDS functions.



Here we have opened the attribute table for one of our PLSS Township shape files and selected the LABEL ALL RECORDS menu choice. This opens the 'Font' interface.



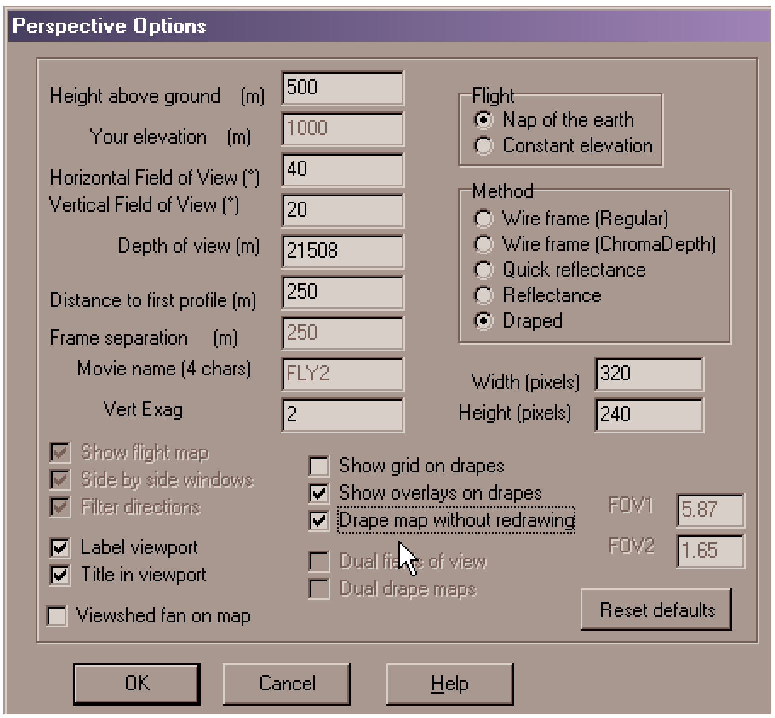
Here you are given the opportunity to select the font, font style, size and color for your attribute labels. Once you have selected the desired font features you click on the <OK> button. This will bring up the ‘Database Field for Label Based on Field’ interface.



Here you will select the specific record label or column header field whose contents will be used to label each record.

Proper Display of Attribute Labels in 3D Views and Fly Throughs.

Once you have displayed the chosen attribute labels for your vector overlays you may wish to use them in generating Perspective Views, Oblique Views or in movies. Your first step after creating your overlays and labels is to zoom –in to the data until the text is clearly visible on-screen. For generation of Perspective View and movies you will need to check both boxes 'Show Overlays on Drapes' and 'Drape Map Without Redrawing'.



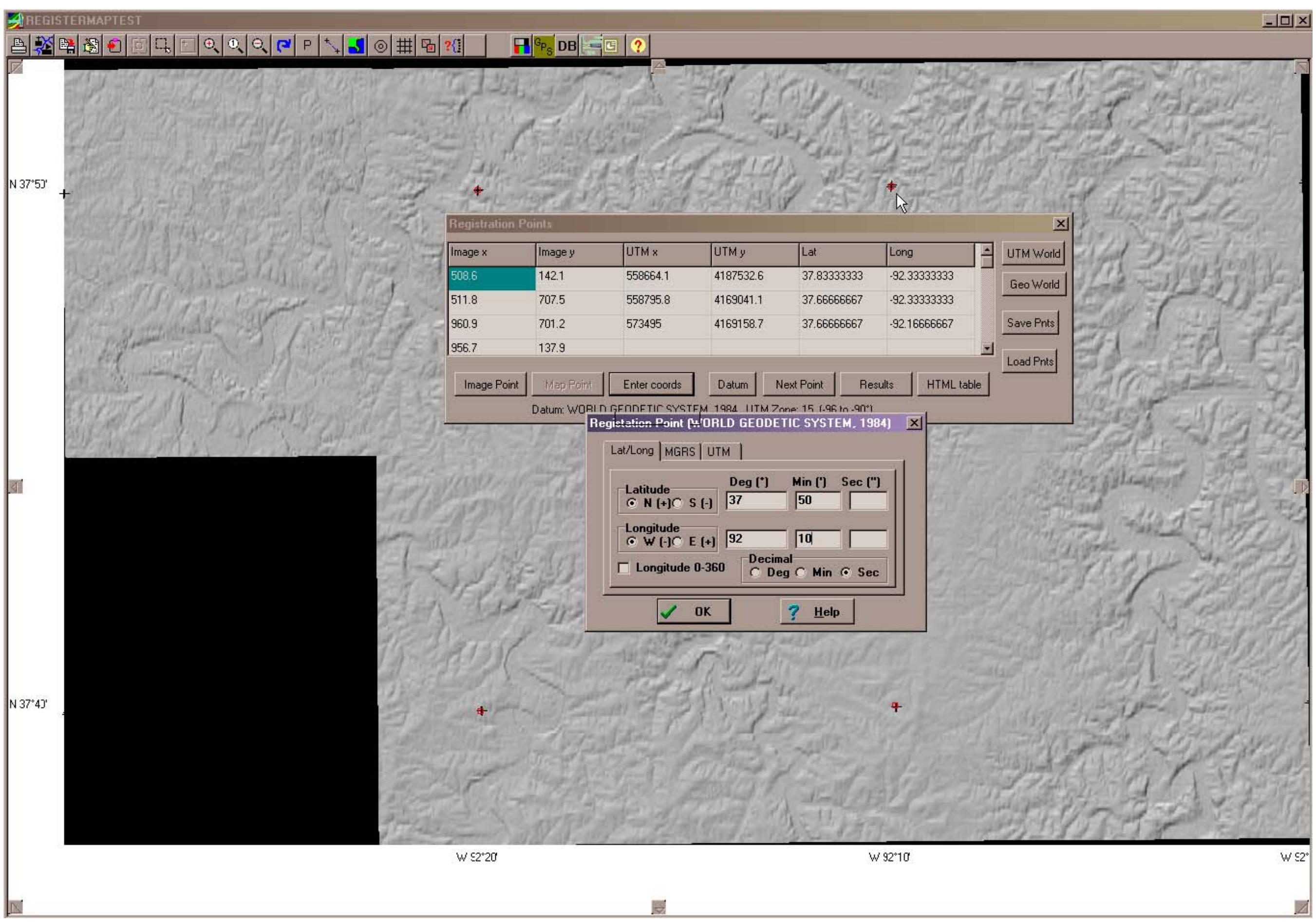
Registering Imagery and Scanned Maps.

This new capability to register .BMP, .JPG, .GIF and .PNG images using three or more control points with known UTM or Lat/Long coordinates allows you to georeference an image or scanned map and create an associated world file.

Before you start make sure that you've set the correct Datum and/or UTM zone.
Step 1. At the main menu select FILE / DATA MANIPULATION to bring up the Data Manipulation menu.

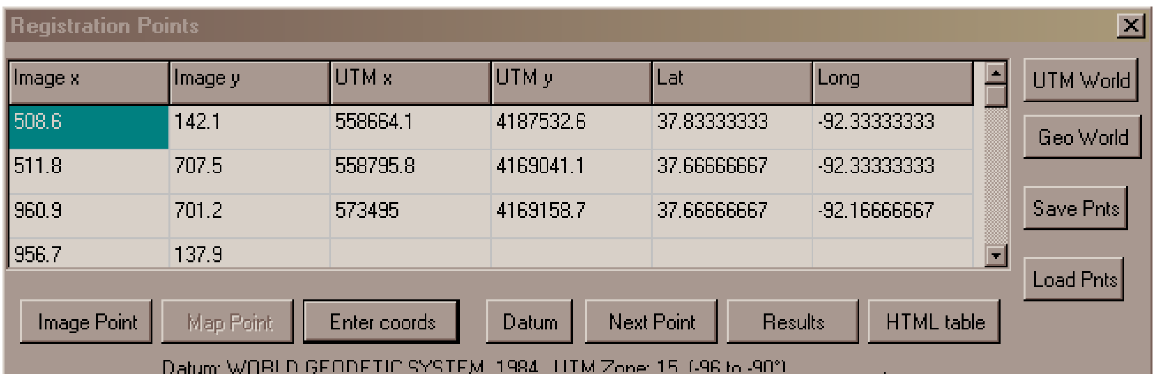
Step 2. In the Data Manipulation menu select REGISTER / IMAGE FOR WORLD FILE. This will open the 'Open Image for World File' window where you will navigate to and select the desired image. After selecting the image this will open the 'RegisterImage' display and the 'Registration Points' interface.

Step 3. Zoom-in the image to 1:1 or as close as you can get to allow precise selection of control points.



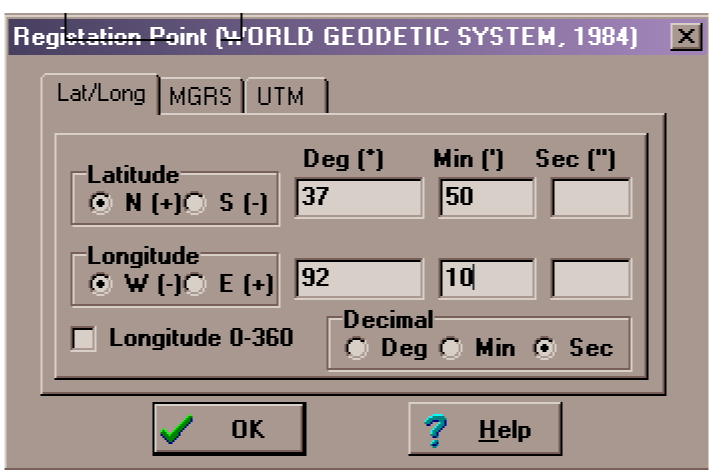
Here we have (previously) saved a reflectance display of elevation data with lat/long grid ticks and marginal labels. This gives us a product similar to a map, in that the control points and the correct coordinates for the control points are readily available on the face of the product for our use.

Scanned maps are the ideal product for this registration function since there is no tedious comparison of features, such as road intersections and no need for GPS coordinates or ground truth for such features used as control points. Also since the map is already built to a given projection it is already geometrically correct. Only ‘rectified’ imagery should be used in this fashion since unrectified imagery will be distorted due to camera geometry and ‘terrain layover’.



Step 4. To begin registration click on the <IMAGE POINT> button then double click on the location for the first control point on the image display; in this case the grid tic at the top left. This will enter the image coordinates (X&Y) for the point.

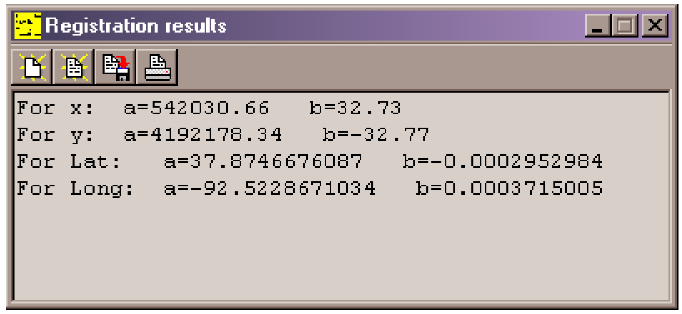
Step 5. Next, click on the <ENTER COORDS> button, this will bring up the ‘Registration Point (WORLD GEODETIC SYSTEM, 1984) interface. Here you will enter the coordinates for the point in either Lat/Long, MGRS or UTM coordinates. After entering the coordinates click the <OK> button to close the interface and enter the coordinate values in your registration table.



Step 6. Click on the <NEXT POINT> button and then double click on the display at the next control point/feature.

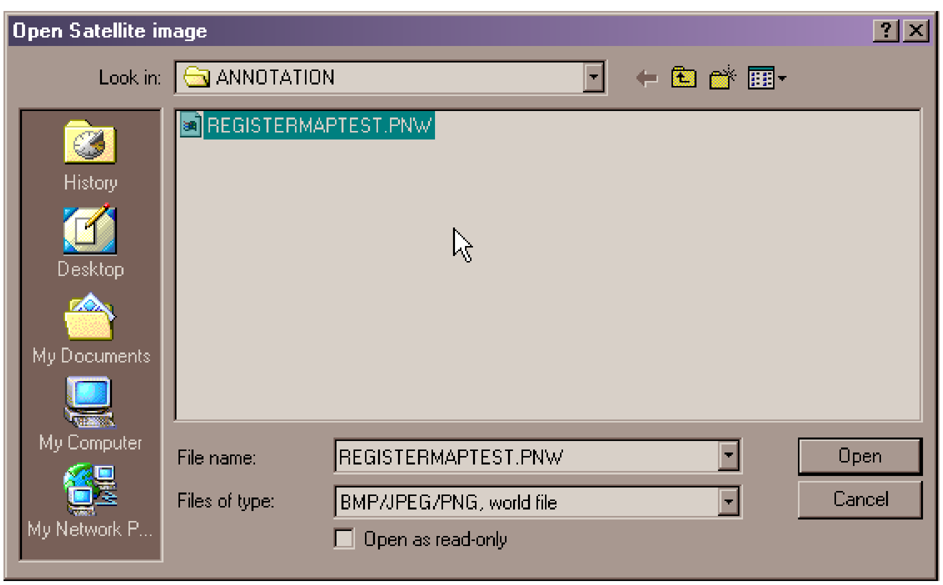
Step 7. Repeat steps 5 through 6 until you have entered at least three control points, widely spaced around the image. If you have a scanned map you should use at least 4 control points, scattered around the perimeter of the map. You may enter as many control points as necessary.

Step 8. If you wish to review the resulting intercepts and pixel size you may do so by selecting the <RESULTS> button.



Step 9. Click on the <GEO WORLD> button (for lat/long coordinates) or the <UTM WORLD> button (For UTM or MGRS coordinates) to generate the 'World File' with the coordinates of your image/map. NOTE: You may save and restore registration data by selecting the <SAVE PNTS> and <RESTORE PNTS> buttons. See the MicroDEM HELP section on 'world file' for more information on this subject.

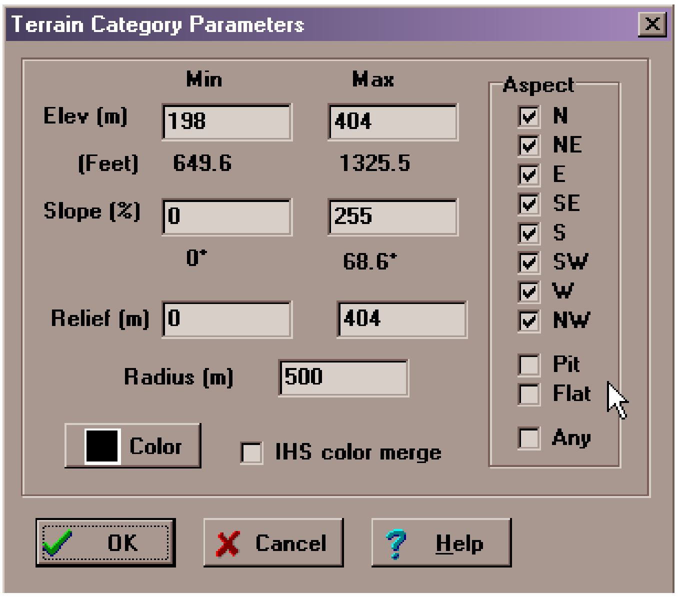
You may display your newly georeferenced image/map by selecting FILE /OPEN SATELLITE IMAGE from the MicroDEM main menu. This will bring up the 'Open Satellite Image' window. Set your 'Files of type' to 'BMP/JPEG/PNG, World File'.



Navigate to the location of your original image and load the associated .PNW world file you've just created.

Terrain Categories Pits and Flats.

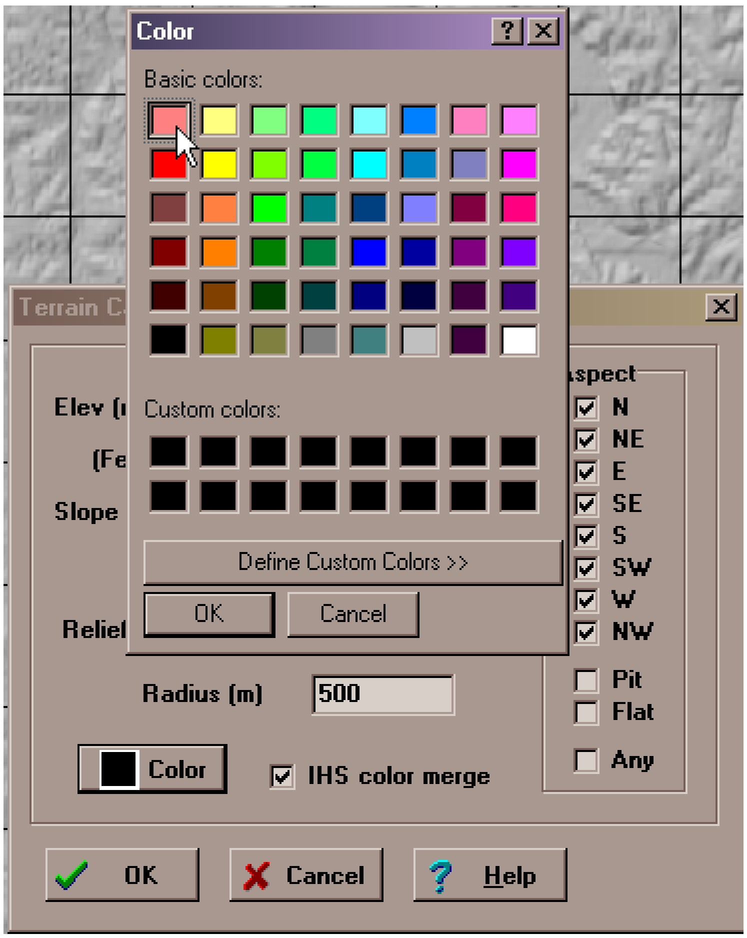
New capabilities have been added to the Terrain Categories function. This function is accessed via the main menu by selecting OVERLAY / TERRAIN CATEGORIES. This will bring up the 'Terrain Category Parameters' interface.



The addition of PIT and FLAT checkboxes offer an easy to use method of applying terrain mask Elevation, Slope and Relief parameters to depressions and level areas.

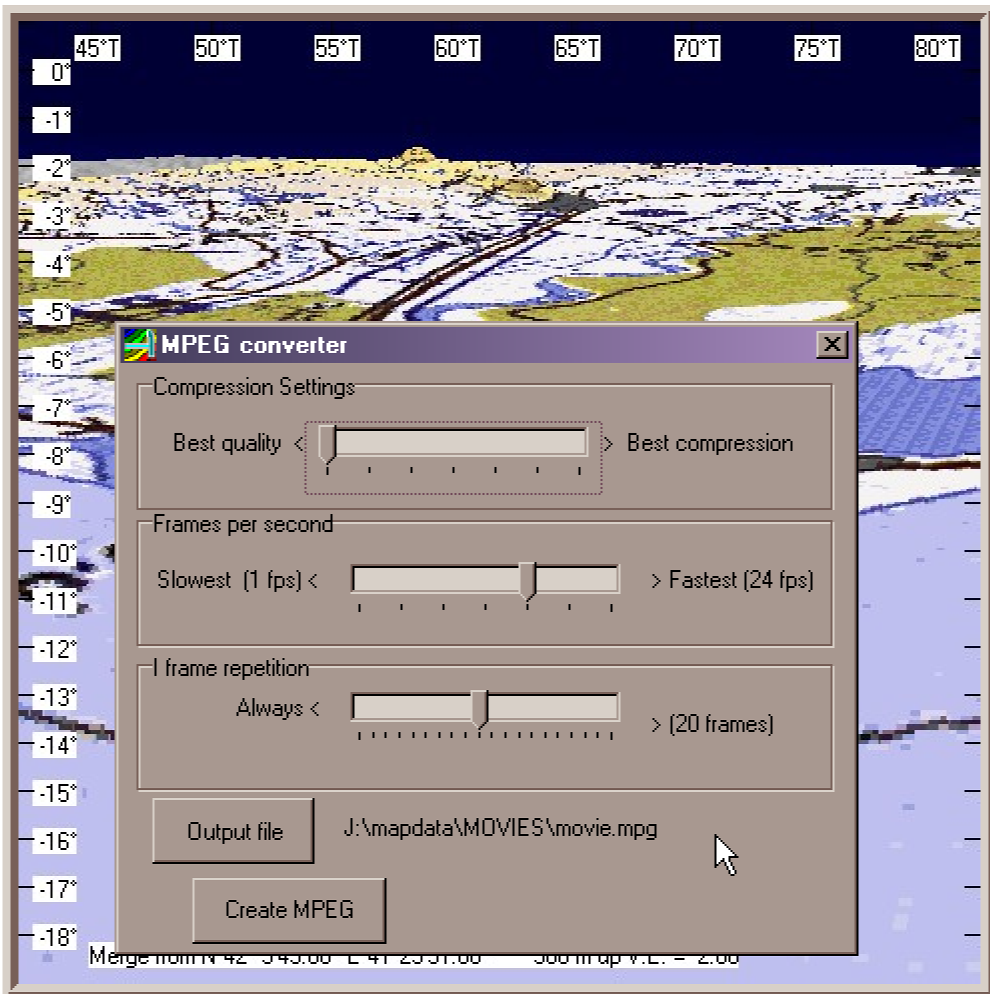
Transparent Terrain Category Masks.

When you create a Terrain Categories product and you wish the resulting mask to be transparent you must check the 'I.H.S Color Merge' box and when selecting the color you must be careful to select a **'pastel'** color rather than a 'primary' color, as shown below.



New MPEG Encoding for Movies.

The new MPEG encoding in MicroDEM allows you to create larger view, longer duration, higher quality movies than previously possible. The new interface also gives you more control over compression, image quality, frame rates and frame repetition parameters.



If you have trouble running these movies with your current movie player you can download the new Microsoft Media Player 9.0 for Windows from the following [**http://www.microsoft.com/downloads/search.aspx?displaylang=en**](http://www.microsoft.com/downloads/search.aspx?displaylang=en)
NOTE: MS Media Player will require a live Internet connection to download the correct CODEC the first time you try to play a movie.
Alternatively, you can download the new QuickTime 6.0 movie player from [**http://www.apple.com/quicktime/download/.**](http://www.apple.com/quicktime/download/)

New Movie Creation Method for Large Areas of High Resolution Data.

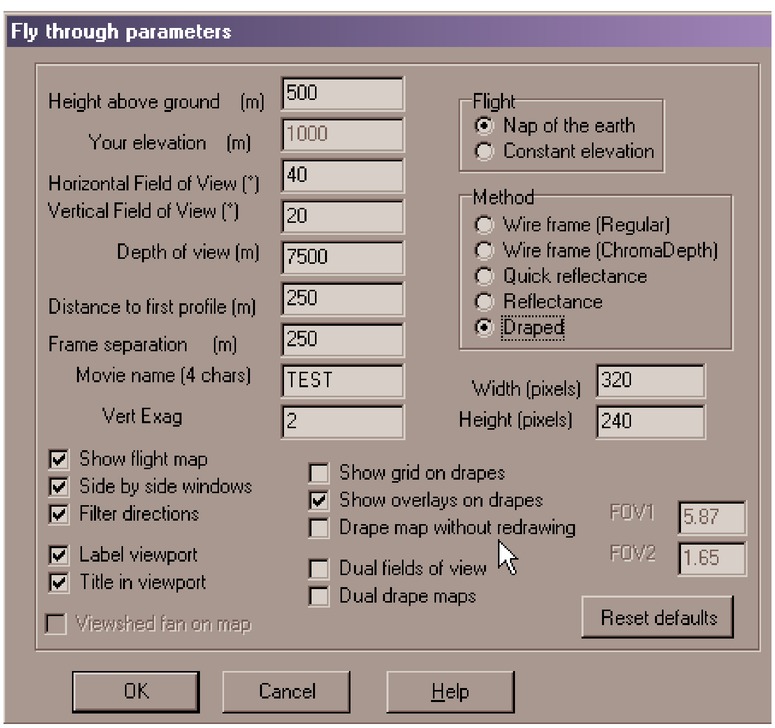
Former versions of MicroDEM allowed you to either define the route for your movie, after which the individual frames were generated over optimized data, or to LiveFly over a lesser resolution data set but with greater control over the route, look direction and other parameters.

You now have the capability to LiveFly your route, changing look direction, pitch, altitude etc, over low resolution data to quickly define the route and other parameters for your movie. You then utilize the FILE / REPLAY FLIGHT ROUTE function with the .FLT file created from your LiveFly session to generate the movie with same flight parameters over optimized, high resolution data.

Step 1. Load the elevation data and the low resolution map or imagery for your area of interest. This can be the same imagery you use for the high-resolution end product, but zoomed-out (subsampled) to display at lower resolution. Note that your display will need to be zoomed-in enough for you to recognize features so that you may choose your desired route.

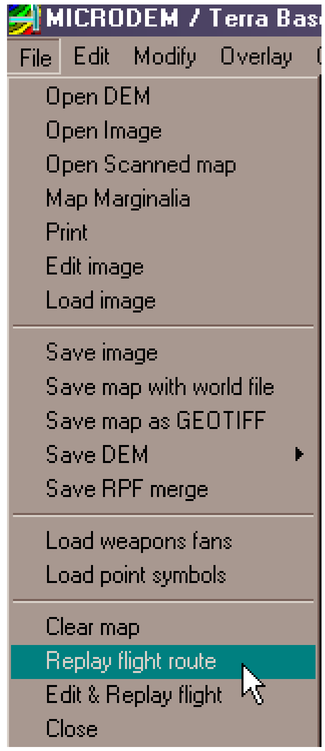
Step 2. Use the LiveFly button 

to initiate your real-time fly through. In the 'Fly Through Parameters' window be sure you have checked the 'DRAPE MAP WITHOUT REDRAWING' box.



Step 3. After you have flown your desired route, load the elevation data and high resolution imagery for your area of interest. This can be the same data sets you just flew with the LiveFly.

Step 4. At the main menu select FILE / REPLAY FLIGHT ROUTE and then select the (.FLT) file from the LiveFly session.



Step 5. In the ‘Fly Through Parameters’ make sure you **un**check the ‘DRAPE MAP WITHOUT REDRAWING’ box.

Your fly through movie will be regenerated using optimized imagery to give the best quality movie. Note that the imagery for the immediate scene will be processed to optimize the image quality, then several frames of the movie will be generated over this optimized data. Then the imagery for the next area will be processed to optimize the image quality and the frames which fall over this area will be generated. This process is repeated until the movie is completed. Be aware that this process can take several hours depending on the length of your movie, the amount of data displayed and the capability of your computer.

NIMA Country Data Importing Procedures.

If you plan to use any of the new NIMA Country Data in MicroDEM you must first manually copy the data shapefiles, which may actually be composed of several files per feature (**.prj, .shp, shx, .sbn, .sbx, .dbf**) to your ..\Mapdata\Nimadata\VPF-Shapes folder.

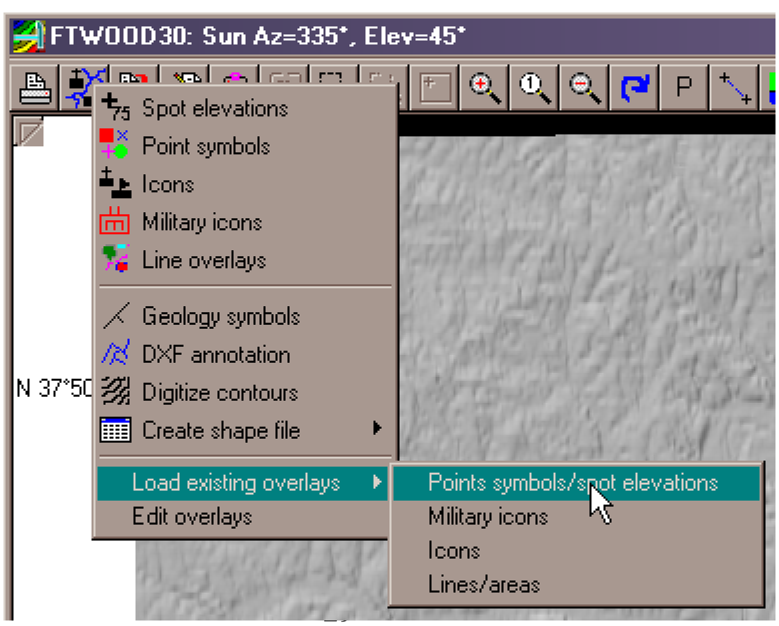
Next select FILE / DATA MANIPULATION from the main menu then select CREATE / VPF COUNTRY GIS INDEX from the Data Manipulation menu. This method may be necessary because there is yet no standard layout for these Country Data sets.

The alternative method of FILE / DATA MANIPULATION / IMPORT / VPF / COUTNRY SHAPE FILES may work your data set. This method is required if you plan to use the Geosym map symbology for your map.

Map Annotation - Spot Elevations and Point Symbols.

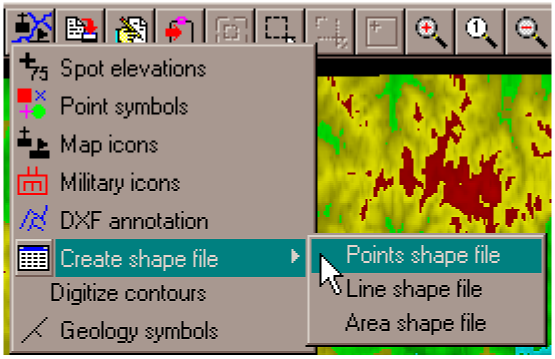
These symbols are now stored as dBase (.dbf) files and may be reloaded and queried by clicking on the <DB> button, navigating to their location on your hard drive (by default in ..\Mapdata\MD-Proj \Points folder) and then selecting the individual file name. This method will open the attribute table for each point or spot elevation record and will allow you to filter and perform queries on the records but will not properly symbolize the features as they were originally created.

The proper way to redispay these files is to utilize the <Map Annotation> icon and select LOAD EXISTING OVERLAYS and POINT SYMBOLS/SPOT ELEVATIONS from the pull down menu.

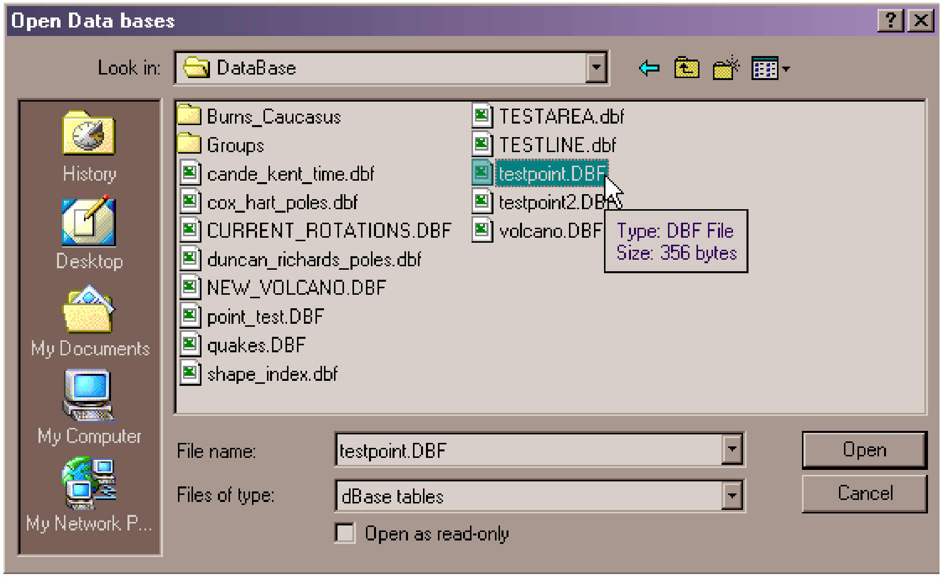


Using this method will redisplay the points and spot elevations as they were originally created. **See Map Annotation Editor for more information.**

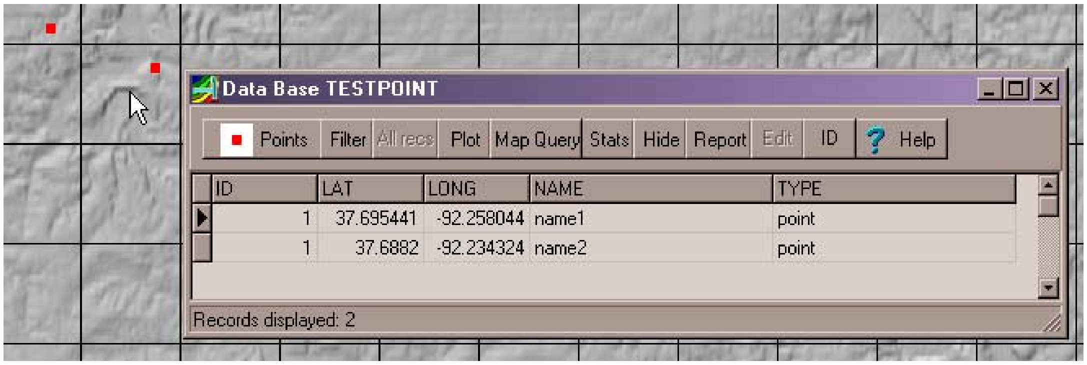
Map Annotation – Shape Files.



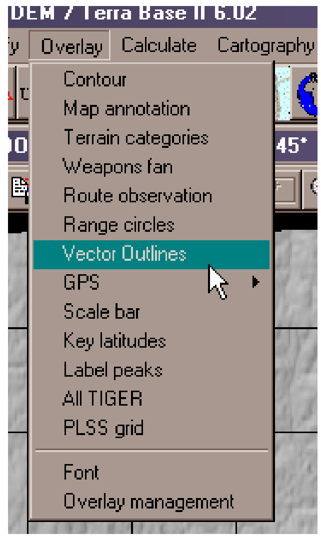
Normal shape files created through the MAP ANNOTATION/CREATE SHAPEFILE /POINTS SHAPEFILE, LINE SHAPEFILE and AREA SHAPEFILE procedure may be reloaded and queried by clicking on the <DB> button, navigating to their location on your hard drive (by default in ..\Mapdata\Database folder) and then selecting the individual file name.



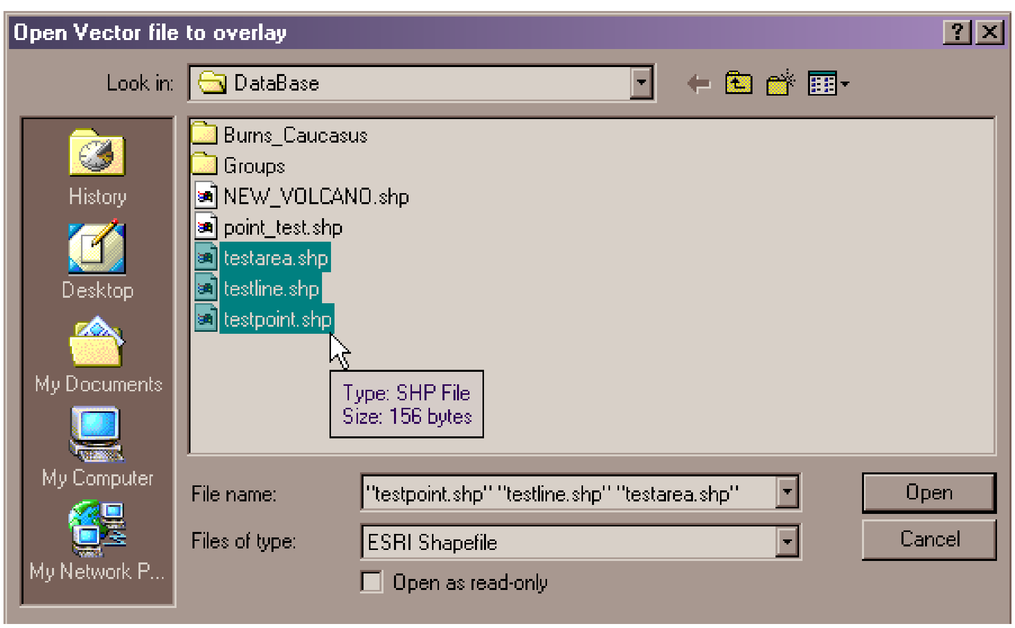
This method will open the attribute table for each point, line or area record and will allow you to filter and perform queries.



If you simply wish to redisplay these files as they were originally created then at the main menu select OVERLAY/VECTOR OUTLINES/ESRI SHAPEFILES.



This will bring up the ‘Open Vector File to Overlay’ window.



Make sure you've selected 'Files of Type' 'ESRI Shapefiles'. Navigate to the location of you files and select one or more (.shp) files to be redisplayed. **See Map Annotation Editor for more information.**

Map Annotation Editor, Drag'n'Drop Editing and Share the COP.

The new Map Annotation Editor works with four classes of data objects and offers Drag'n'Drop, Deletion and Editing functionality for these objects:

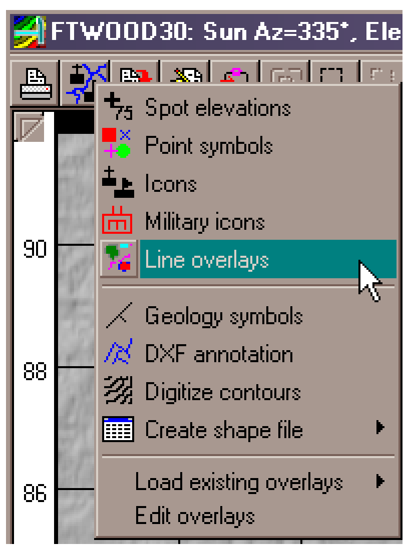
POINTS – which include Spot Elevations and Point Symbols (Spots and Points can be appended to and share the same .dbf file).

ICONS – which include pre-scaled .bmp, gif and .cgm files in your ..\Mapdata\Icons folder.

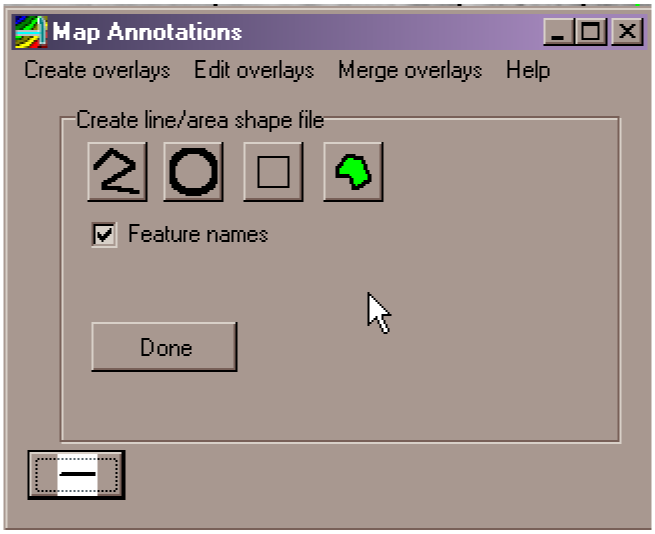
MILITARY ICONS – which include icons generated in the Military Icon Composer.

LINES – a new class of simple line, circle, rectangle and polygonal shapefiles whose only attributes are their coordinates and their name.

Here we have selected the LINE OVERLAYS function from the pull down menu.



This will bring up the Map Annotations interface with the 'Create line/area shape file' functions.



Here you can select the type of Line object you wish to delineate: line, circle, rectangle, and polygon. When you are finished drawing click on the <DONE> button to close the Create line/area shape file section of the interface. You will then be able to continue creating other objects via the 'Create Overlays' menu or close the Map Annotation interface by clicking on the <X> button at the top right corner.

Once you have created your Spot, Point, Icon, Milicon and Line overlays their respective .dbf files are stored in your ..\Mapdata directory in the following folders:

SPOT ELEVATIONS – in ..\Mapdata\MD-Proj\Points folder.

POINT SYMBOLS – in ..\Mapdata\MD-Proj\Points folder.

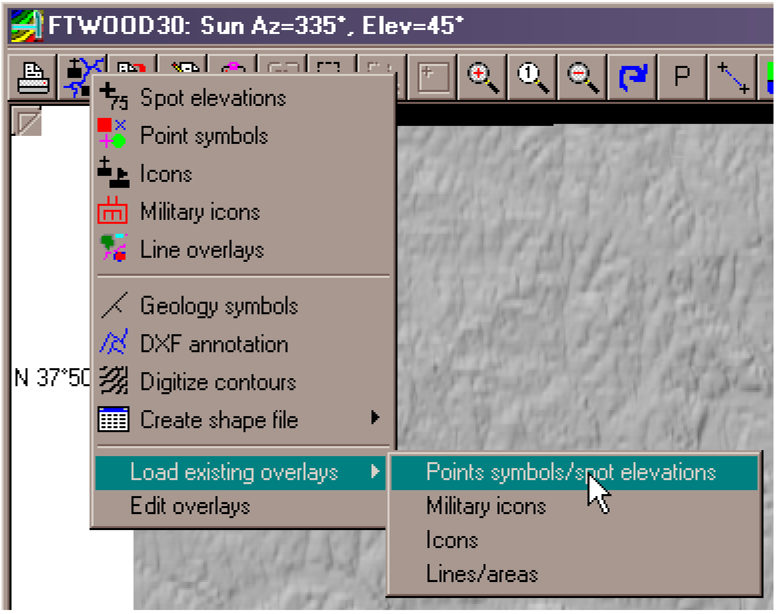
ICONS – in ..\Mapdata\MD-Proj\Icons folder.

MILITARY ICONS – in ..\Mapdata\MD-Proj\Milicons folder.

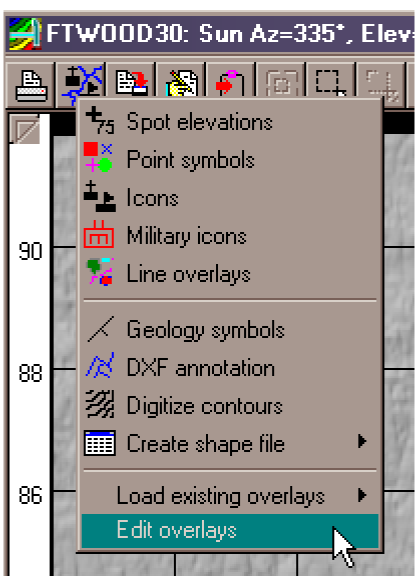
LINE OVERLAYS – in ..\Mapdata\MD-Proj\Annotation folder.

This allows you to redisplay your overlays at any time.

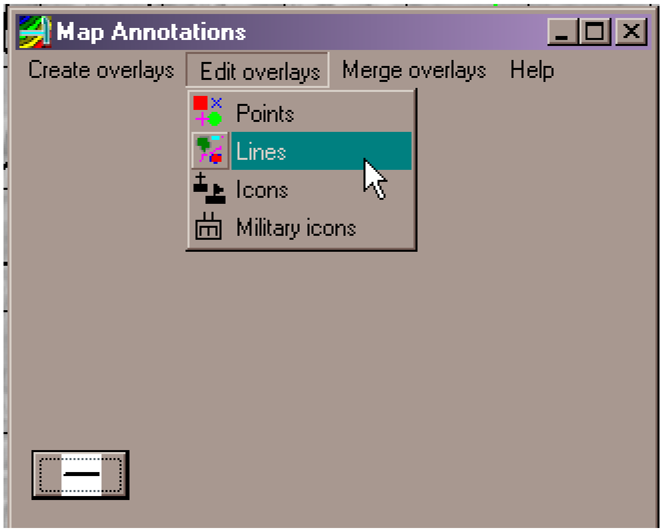
This also allows you to **email and share these overlays with other MicroDEM 6.03 users**. Now you can build and share the **Common Operational Picture (COP)** as long as all users have the background elevation, imagery or map data over which they will redisplay these common overlays.



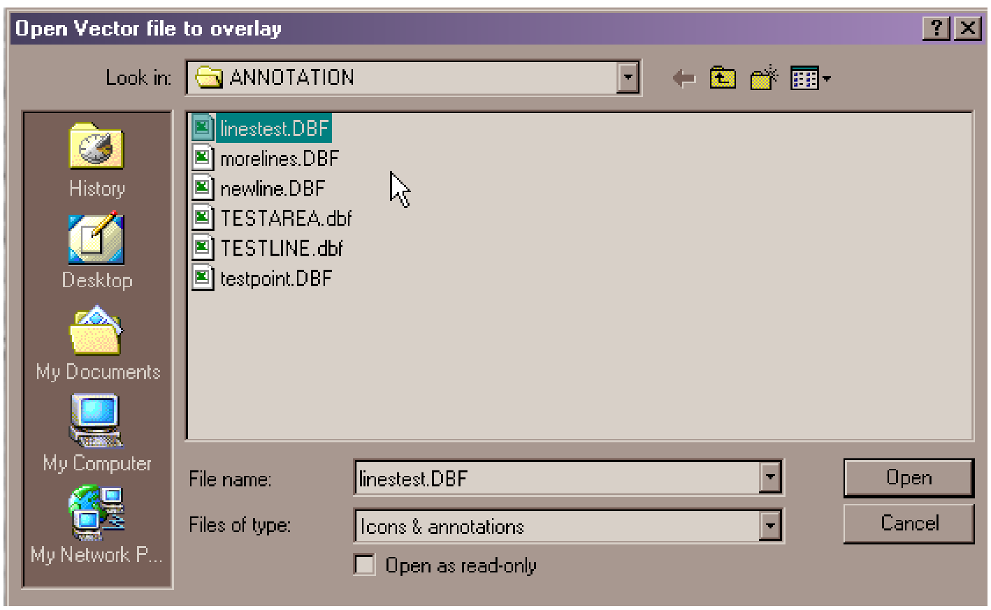
Once you have redisplayed your overlays you can edit them using the new Map Annotation Editor. To bring up the editor select EDIT OVERLAYS from the Map Annotation icon pull down menu.



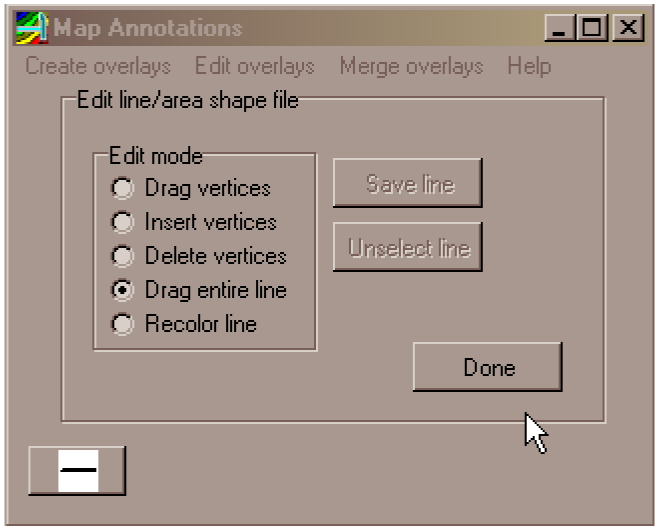
This will bring up the Map Annotations editor interface.



Here you select the type of object overlay you wish to edit. This will open the 'Open Vector File to Overlay' window.

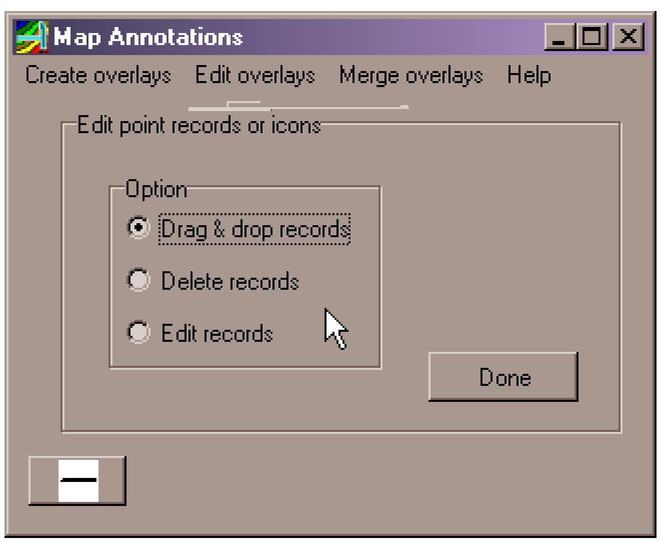


Here you will navigate to the location and select the .dbf file you wish to edit. This will bring up the 'Map Annotations' Editor with the 'Edit line/area shape file' interface.



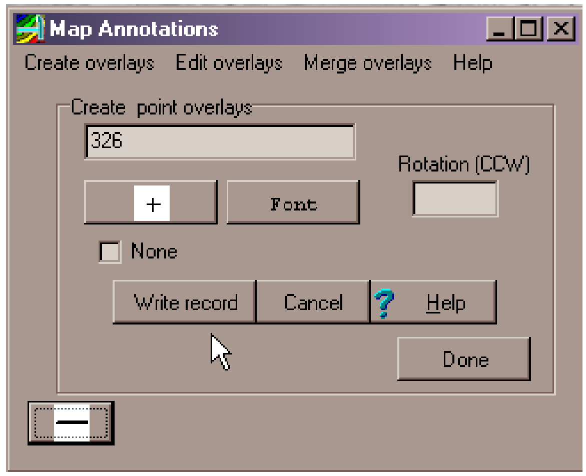
The ‘Lines’ editor is the most complicated editor available on the Map Annotations interface allowing you to DRAG VERTICES, INSERT VERTICES, DELETE VERTICES, DRAG ENTIRE LINE and RECOLOR LINE.

When you have completed the edits for the selected line, circle, rectangle or polygonal object you must click the <SAVE LINE> button to save the results of your edit. When you have completed all Line editing you must click the <DONE> button to close the ‘Edit line/area shape file’ section of the editor.

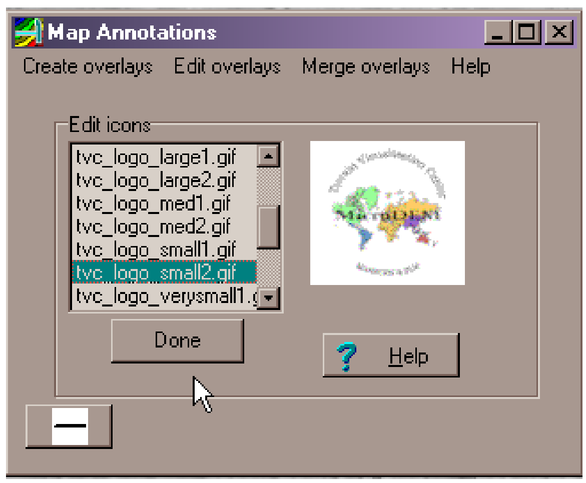


The Spot Elevations, Point Symbols, Icon and Military Icons ‘Edit point records or icons’ interface (shown above) is much simpler. The DRAG & DROP RECORDS and DELETE RECORDS options are self-explanatory. The EDIT RECORDS options will bring up the original Spot Elevation, Point Symbols, Icons or Military Icon Composer interface (as show below).

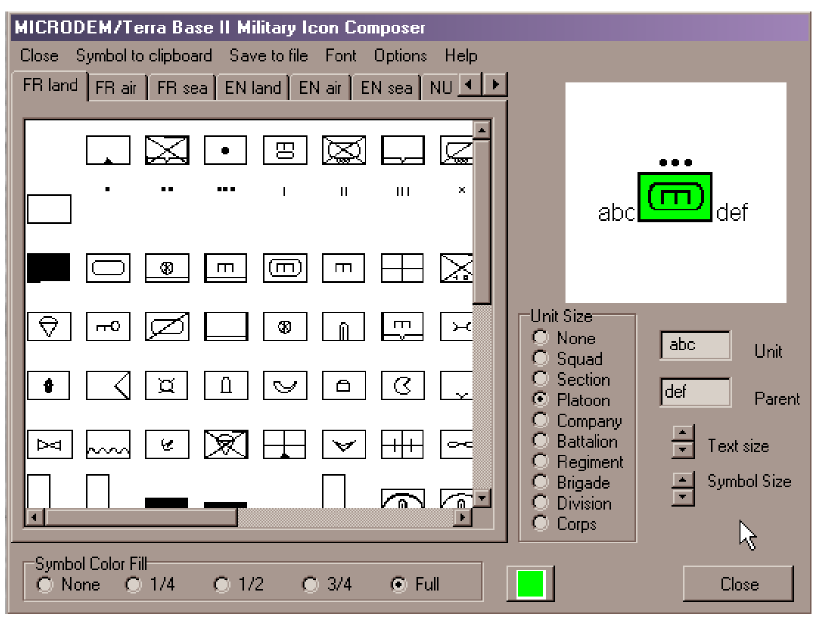
SPOT ELEVATIONS & POINT SYMBOLS →



ICONS →

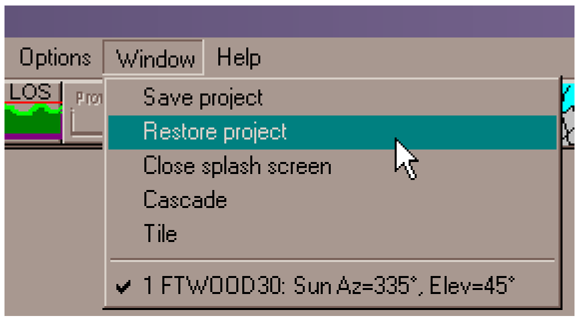


MILITARY ICONS →

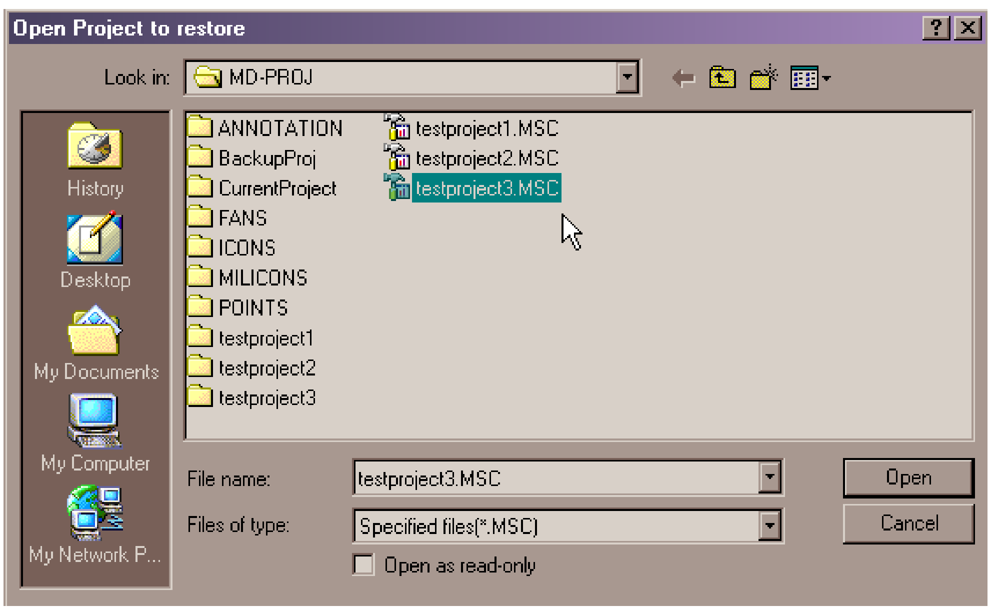


Save Project and Restore Project.

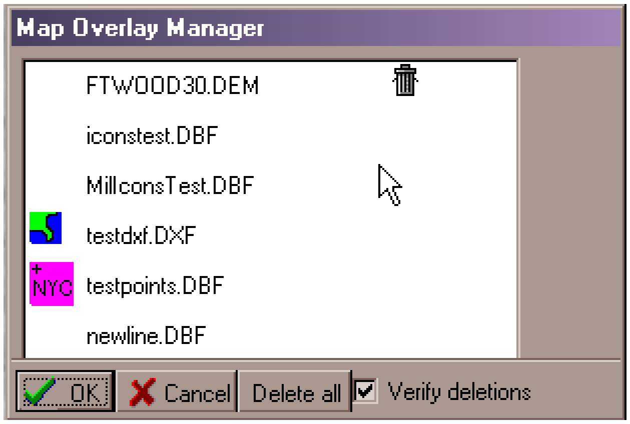
The new Save and Restore Project functions are accessed at the main menu by selecting WINDOWS / SAVE PROJECT and RESTORE PROJECT. These functions now will save and restore your background map/imagery/grid as well as overlays for: Autocad Digital Exchange Files (.dxf), Spot Elevations, Point Symbols, Icons, Military Icons and the line, circle, rectangle and polygons objects (.dbf) of the new Line class. **See Map Annotation Editor, Drag'n'Drop Editing and Share the COP**.



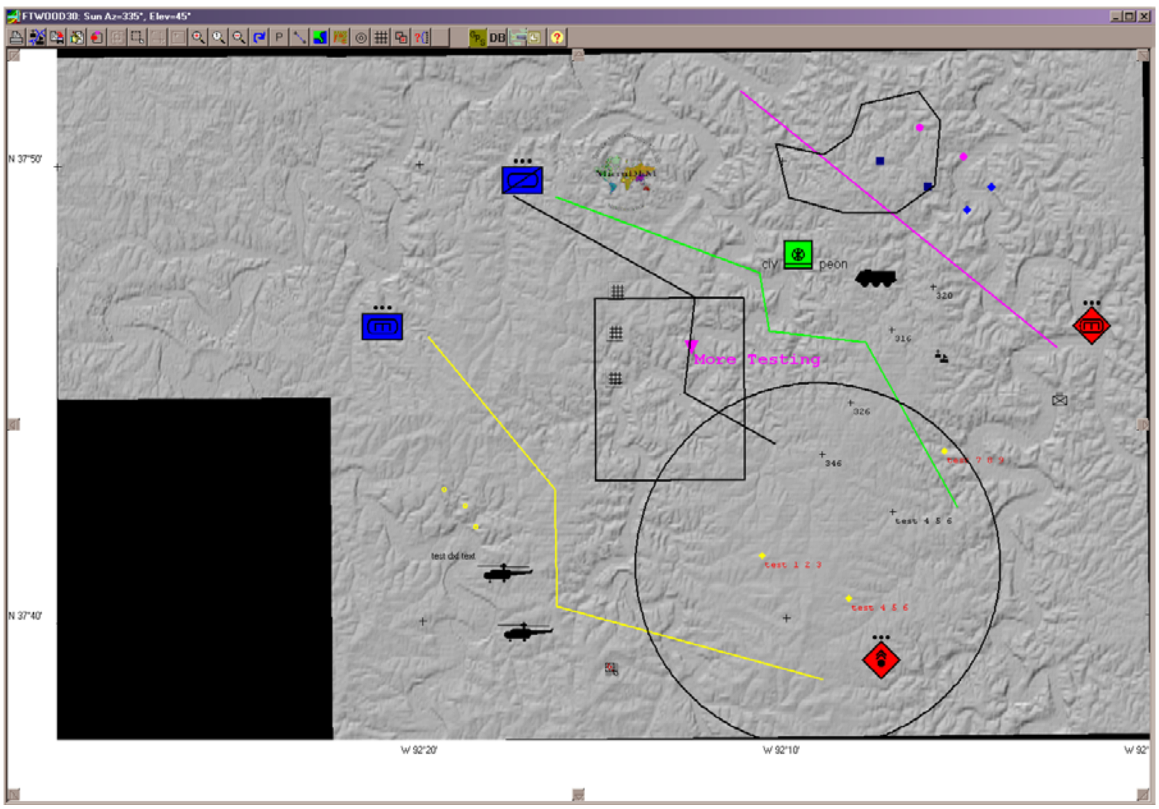
Projects are stored as both a file and directory in your ..\Mapdata\MD-Proj\ folder.



Selecting the desire (.MSC) file will restore your project.



NOTE: The OVERLAY / OVERLAY MANAGER allows you to restack or delete individual components of your project.

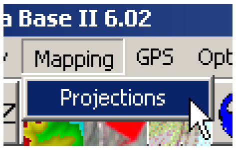


This is a quick example of a restored project containing the background 30 meter DEM and six types of overlays: DXF, Spot Elevations, Point Symbols, Icons, Military Icons and Lines which may be saved and restored in a project.

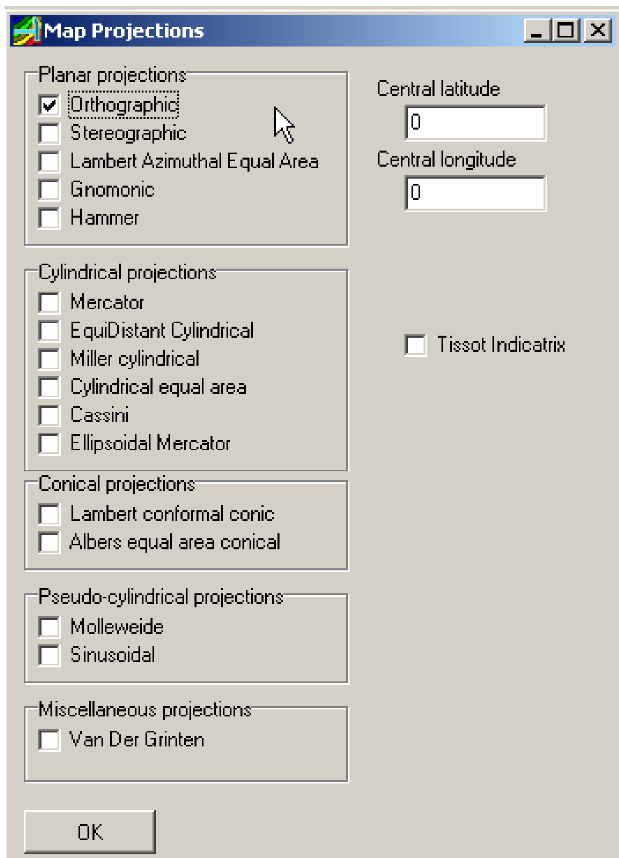
NOTE: Projects cannot be shared between different computers unless the drive names and data layout are identical since the absolute path to each component of the project is stored in the project file.

Map Projections

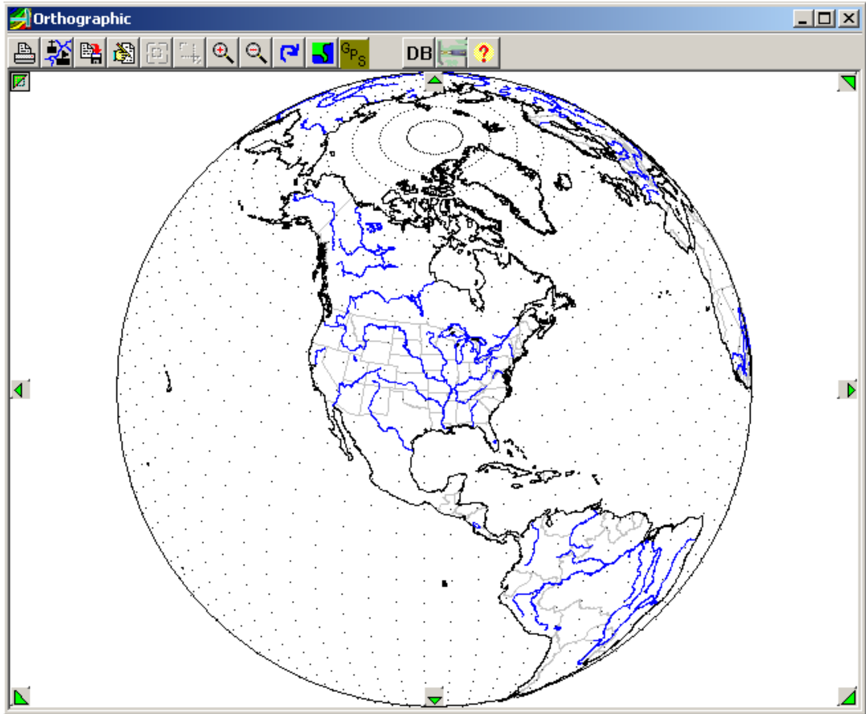
The new Map Projection displays are intended to be used for educational purposes and are accessed via the MAPPING / PROJECTION function in the main menu.



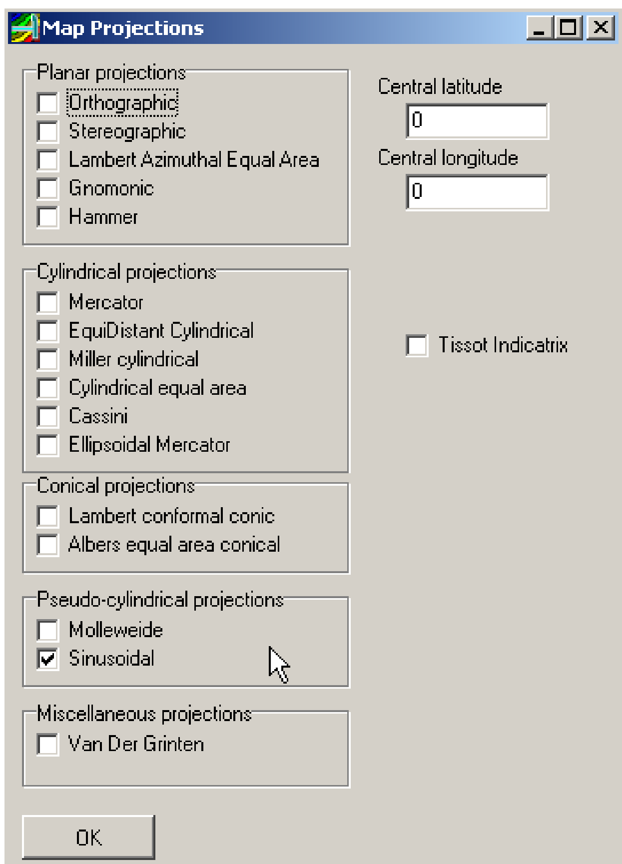
This will bring up the Map Projections interface.



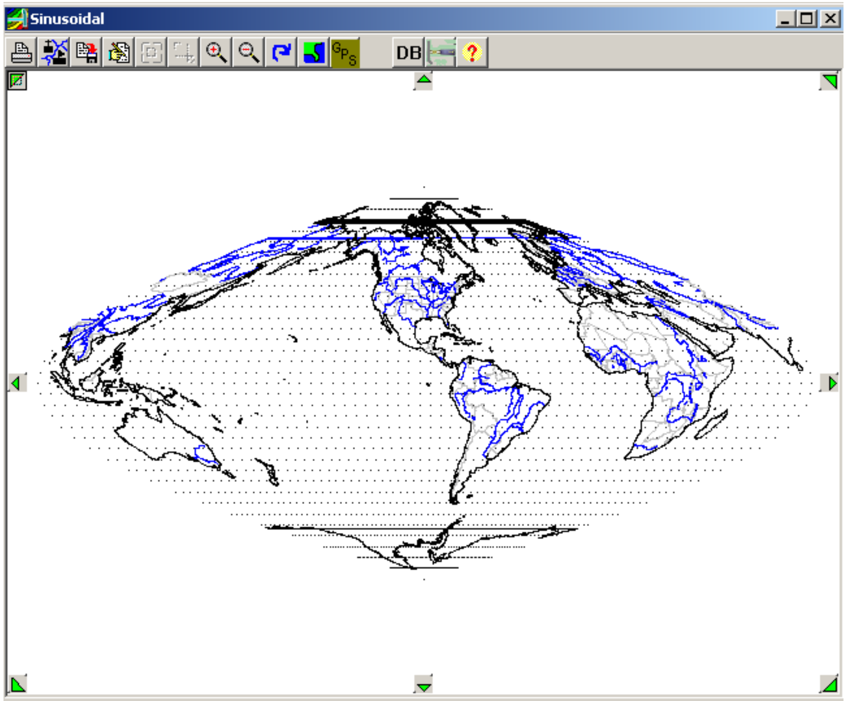
Here you select the desired projection and enter the lat/long coordinates in the Central latitude and Central Longitude data entry fields.



Here we see the world vector map displayed in Orthographic projection centered on Fort Leonard Wood.



Here we have selected Sinusoidal projection from the list of Pseudo-cylindrical projections.

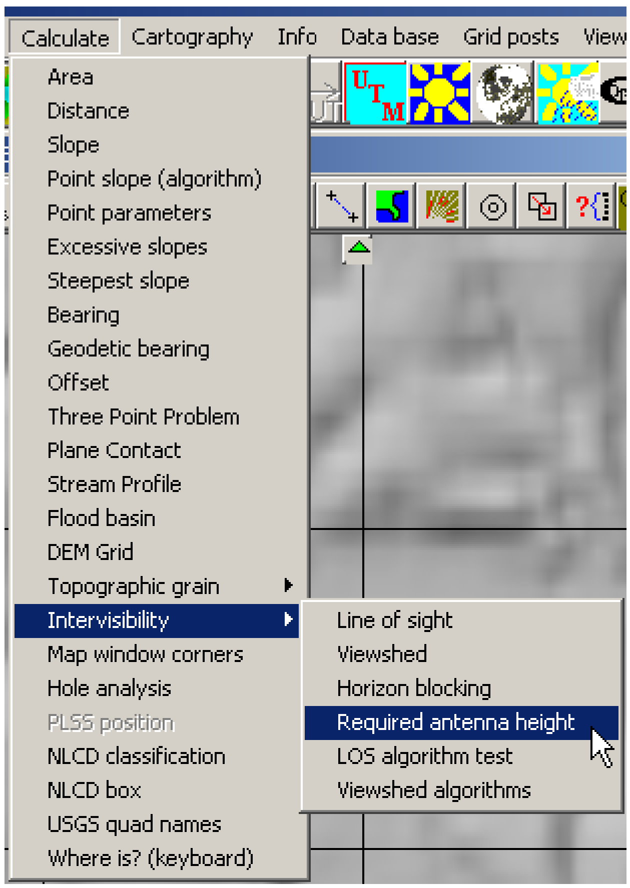


Here we see the world vector map displayed in Sinusoidal projection.

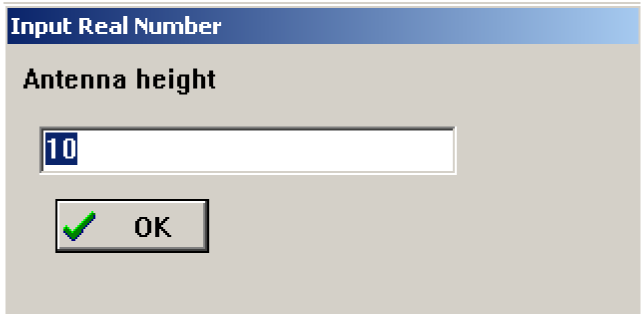
Required Antenna Height

This new function allows you to enter the location and height for one antenna and will then generate another DEM map. Then as you roam over the map, the status bar will show you the height of the antenna required at that location to see the fixed antenna, using the earth curvature algorithm in use.

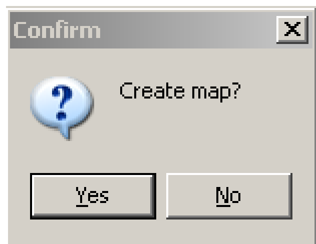
After loading the elevation data for your area of interest you access this new function by selecting CALCULATE / INTERVISIBLITY / REQUIRED ANTENNA HEIGHT from the main menu.



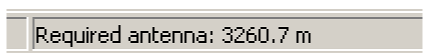
Double clicking on the elevation display (or draped map/imagery), at the desired location for the first antenna, will bring up the Input Real Number interface.



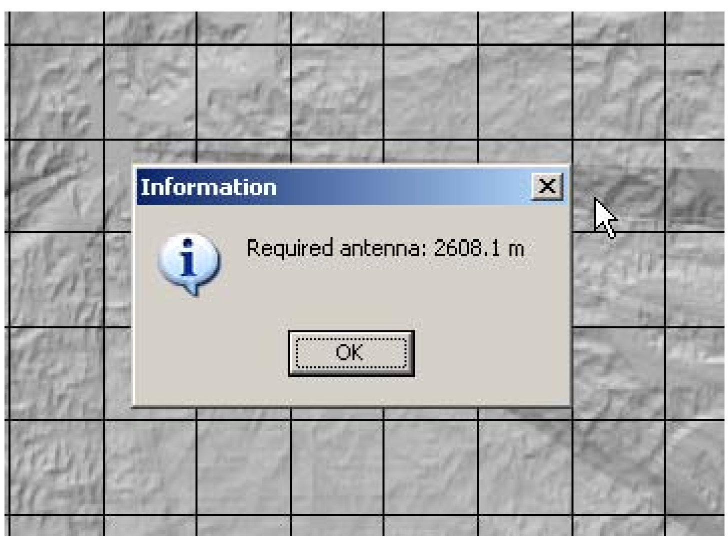
Here you will enter the height, above ground level (AGL) of the antenna. This will bring up the ‘Confirm’ pop-up.



Here you should select the <YES> button. After a period of time a new DEM map will be generated and displayed.

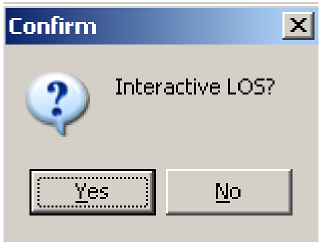


As you move your mouse cursor over the new map the required antenna height at that location will be displayed at the bottom of the display.

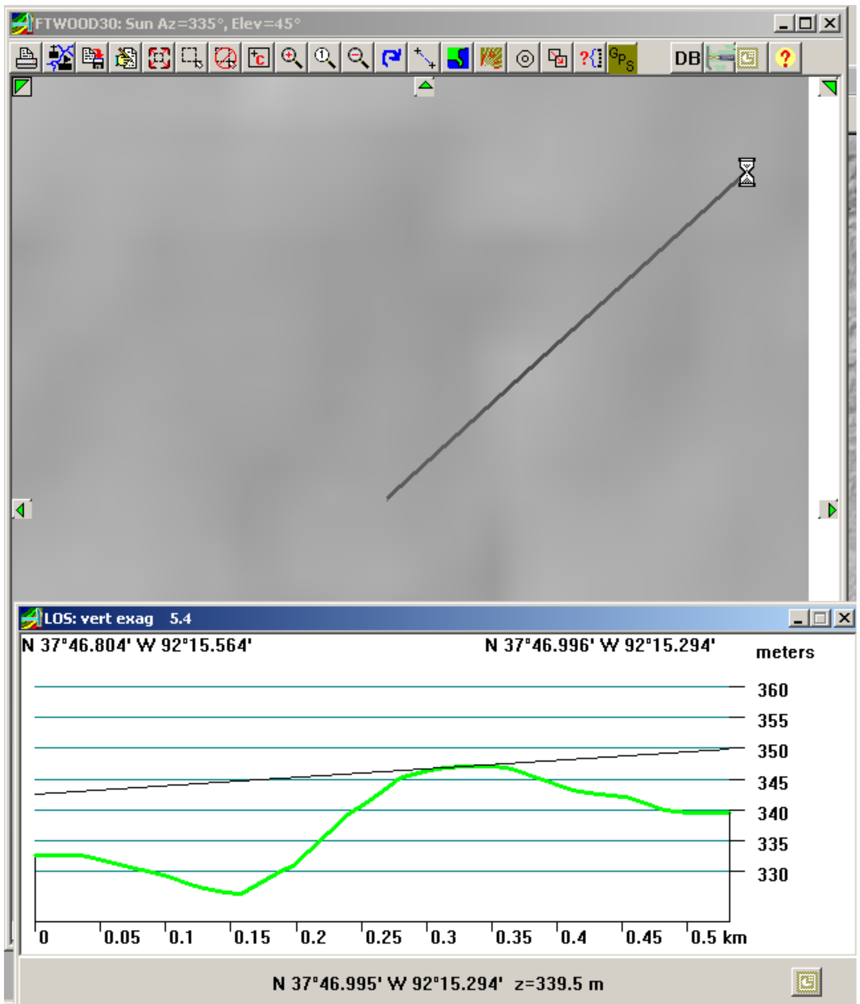


Double clicking on the new map will generate a pop-up ‘Information’ display with the required antenna height.

You will also get another ‘Confirm’ pop-up asking if you would like an ‘Interactive LOS’ display.



Answering <YES> will generate a graphical display with the initial antenna position shown on the left end of the graph and the location second antenna (located at your mouse pointer) on the right end of the graph.



Here we show the DEM map (very small area) and graphical cross section (rescaled to fit screen). The map display shows the black line connecting the original antenna and the new antenna position. Moving your mouse cursor over the **original** DEM display will generate a new graphical display with the second antenna at the current mouse pointer location. NOTE that there will be a time delay between the calculations for each position on the display, indicated by the cursor changing from an arrow to an hourglass.

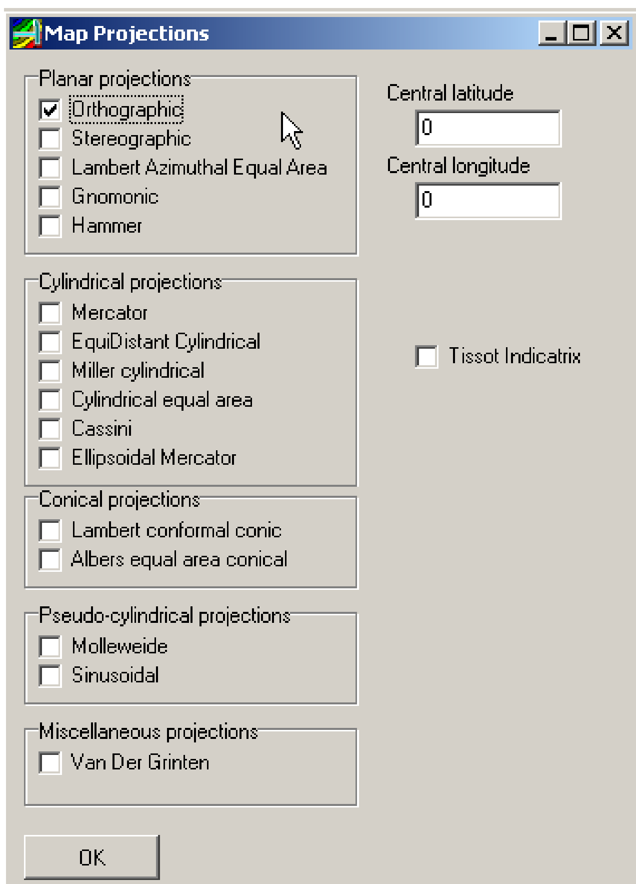
Earth Rotation Movies

If you have downloaded world-wide elevation data, such as ETOPO5 or Globe or world-wide imagery such as NASA's Blue Marble imagery you can use it to drape over a globe and then create a movie of the rotating Earth. See the HELP file for links to these and other data sets, which may be downloaded (free of charge) from the Internet.

NOTE: You must first select OPTIONS at the main menu and check the' Cartography' box under the Menu Choices tab for this feature to work.

At the main menu select MAPPING / PROJECTIONS.

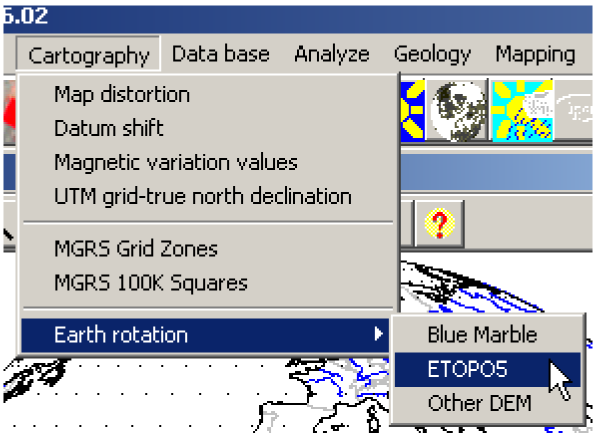
This will bring up the Map Projections interface.



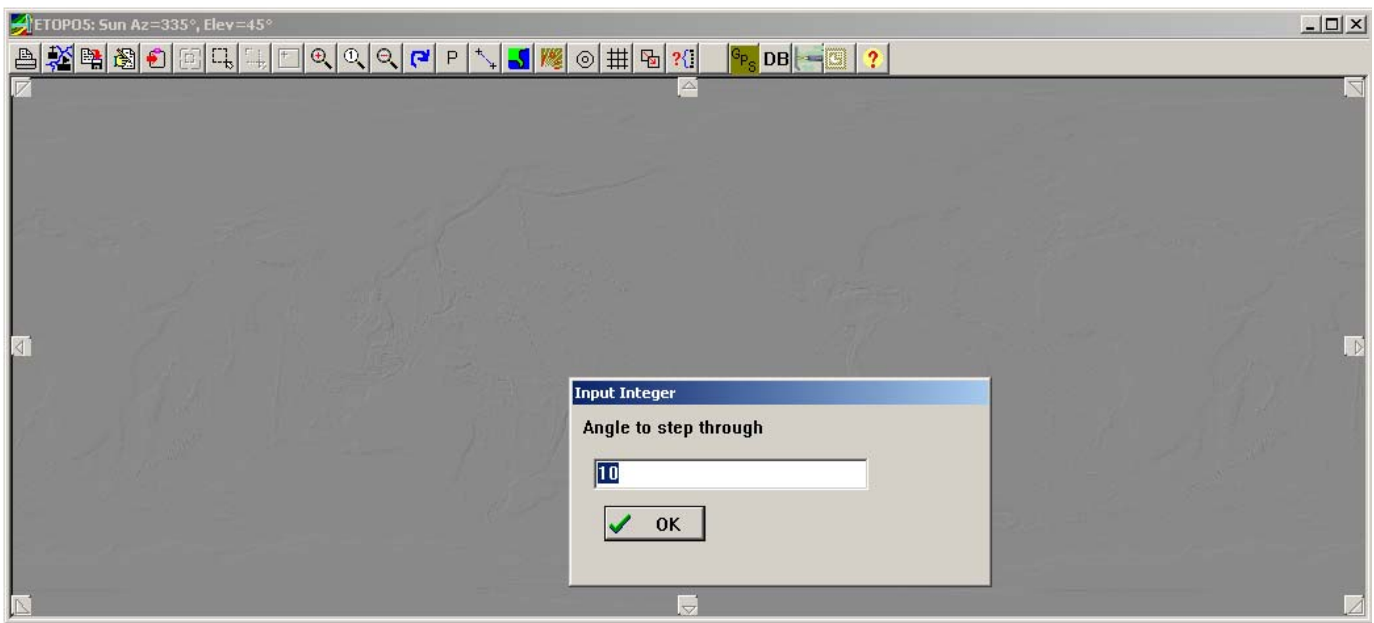
Here you must select Orthographic, Stereographic or Lambert Azimuthal Equal Area projection from the Planar Projections list.

NOTE: You must have already placed your elevation data in your ..\Mapdata\DEM folder. You must have already placed your Blue Marble imagery's 'NASA' folder in your ..\Mapdata folder. The ETOPO5 data is a single file after being unzipped. The NASA folder contains a JPEG subfolder which contains 2594 jpegs.

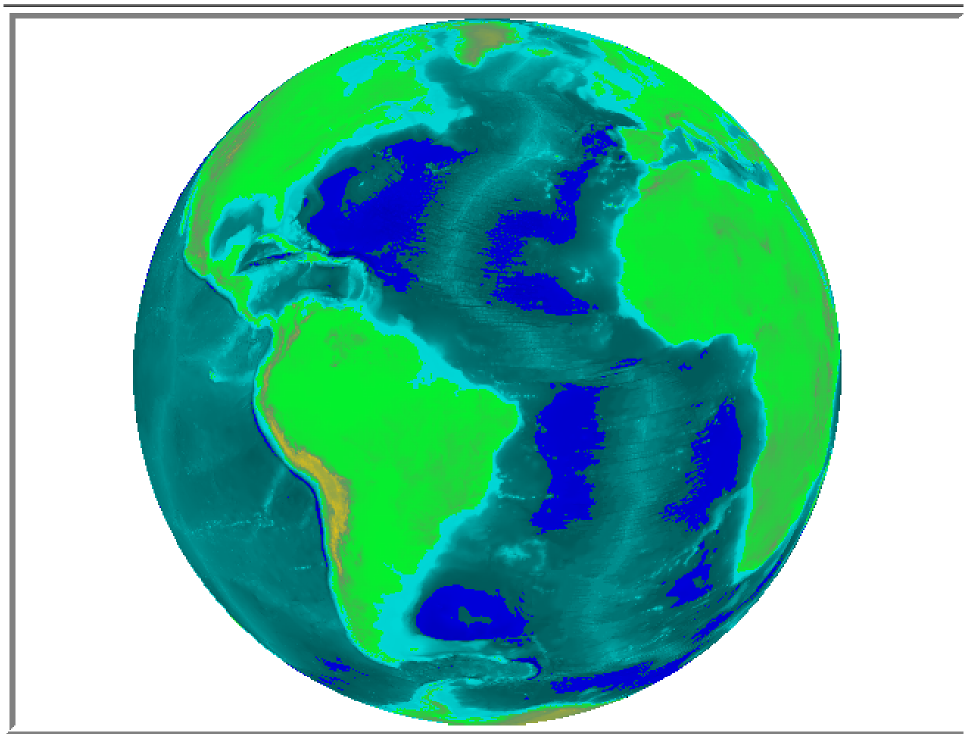
Next select CARTOGRAPHY / EARTH ROTATION from the main menu. The pull down menu offers three choices: Blue Marble, ETOPO5 and Other DEM.



Here we have selected ETOPO5 from the pull-down menu.

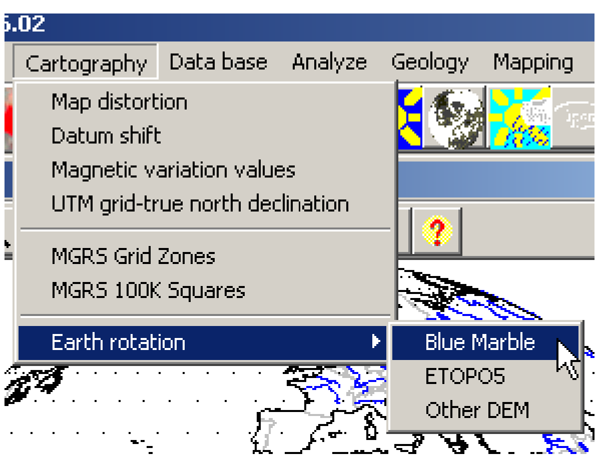


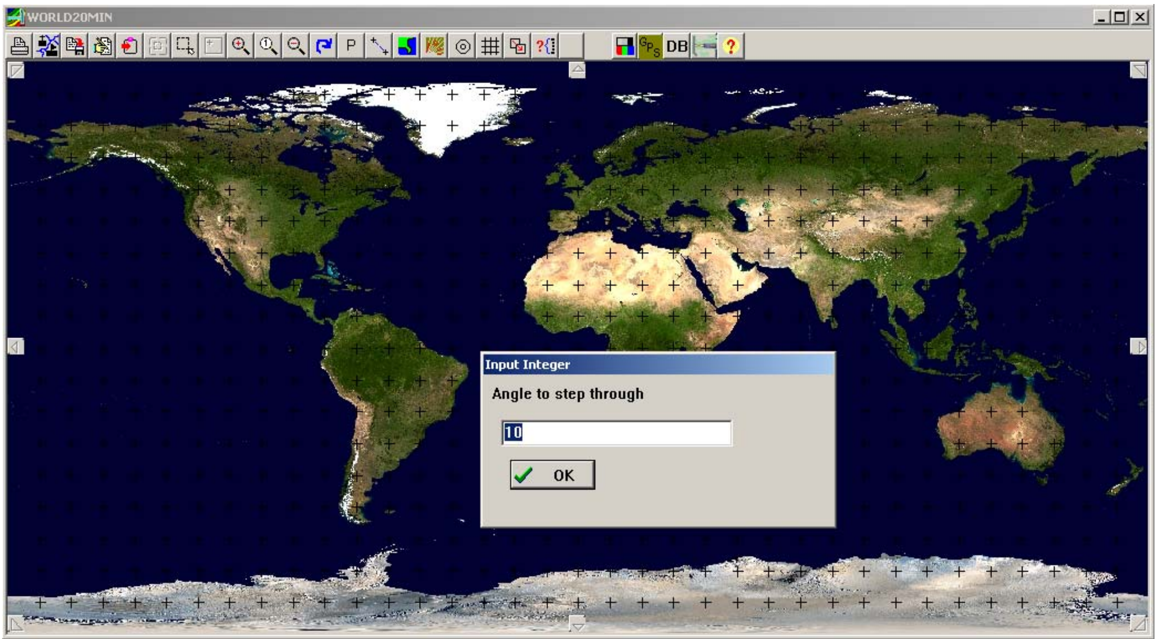
A 2D grayscale display of the elevation data is produced and the 'Input Integer' dialog pop-up will ask you to enter the angular distance the globe will be rotated between each frame of the movie. The default 10 degree setting will generate a 36 frame movie.



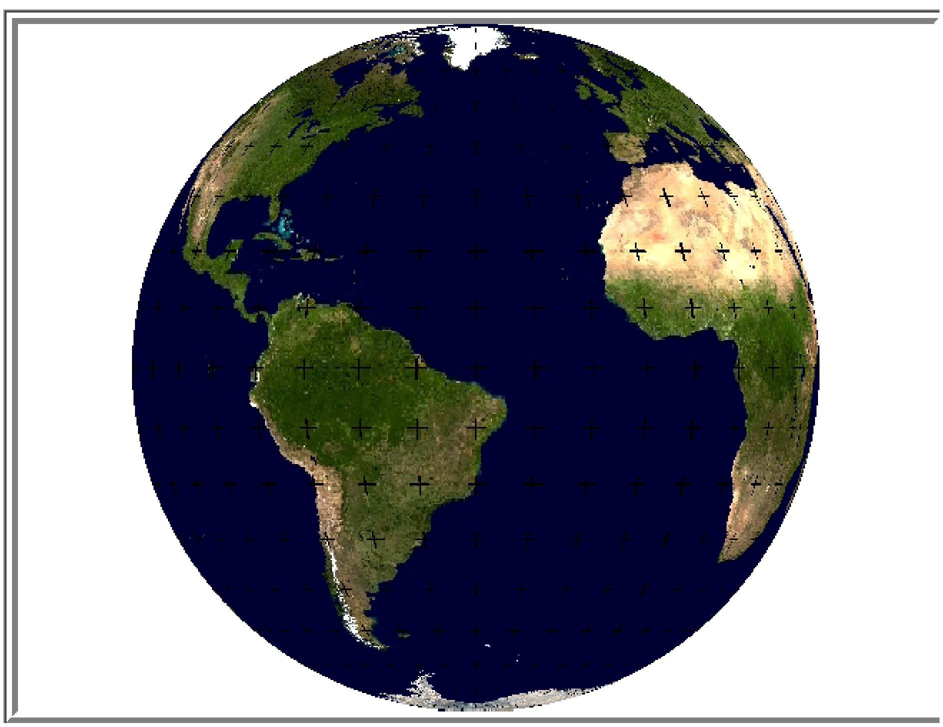
Here is one frame of the Earth Rotation movie using the ETOPO5 dataset.

To generate a Blue Marble Earth Rotation Movie go to the main menu and select CARTOGRAPHY / EARTH ROTATION. Then select Blue Marble from the pull-dwon menu.





A 2D display of the Blue Marble imagery is produced and the 'Input Integer' dialog pop-up will ask you to enter the angular distance the globe will be rotated between each frame of the movie. The default 10 degree setting will generate a 36 frame movie.



Here is one frame of the Earth Rotation movie using Blue Marble imagery.

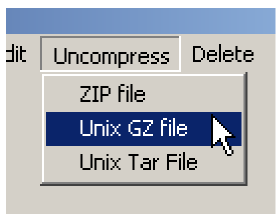
Once created, you may convert these movies to standard .AVI, .GIF or .MPG format as described in previous sections of the manual.

Gazetteer Labeling of Map Displays

Gazetteers are files containing significant place names and their locations. These files may be used to locate and label a variety of natural and made-made features to include: Peaks, Lakes, Airports, Populated Places, Schools and Churches. There are three basic types of gazetteers available for MicroDEM users. (The following paragraph is borrowed from the MicroDEM HELP file.)

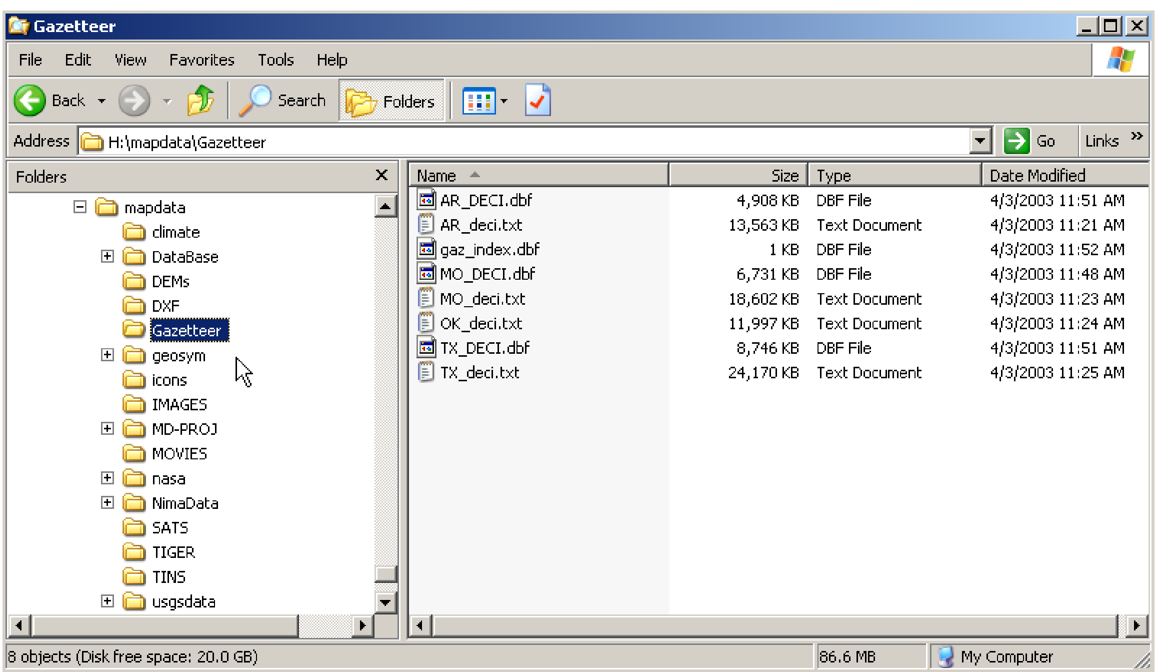
NIMA Geonet names server: there are 1-2 files per country, but no coverage for the US.
DTED CDs, which have a different version of the NIMA files than is present on the WWW.
USGS NAMES server: there are files for each state, in two formats. You need the Quote and Comma Delimited Format, with the "deci" in the file name.

Files downloaded from the USGS Names Server are standard ASCII files and are not compressed. Other gazetteer files downloaded from the Internet may need to be decompressed. You can decompress standard .zip, gzip and .tar format files by selecting FILE / DATA MANIPULATION from the main menu to bring up the Data Manipulation interface.



Here you will select UNCOMPRESS and the desired format from the menu.

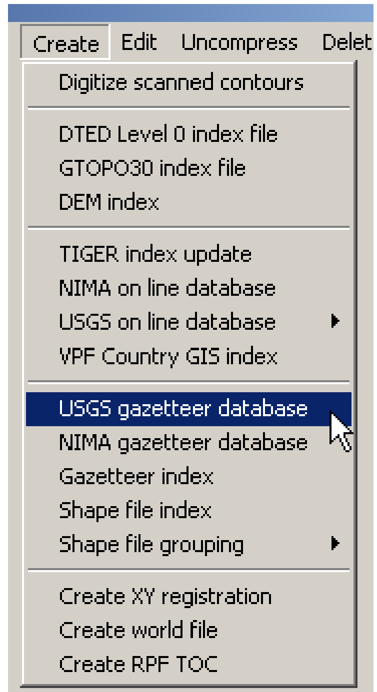
Next you will need to copy the uncompressed files to your ..\Mapdata\Gazetteer folder.



Once you've copied the data to the Gazetteer folder you will need to convert each file from its ASCII format to a (.dbf) database file. At the main menu select FILE / DATA MANIPULATION to bring up the Data Manipulation interface.

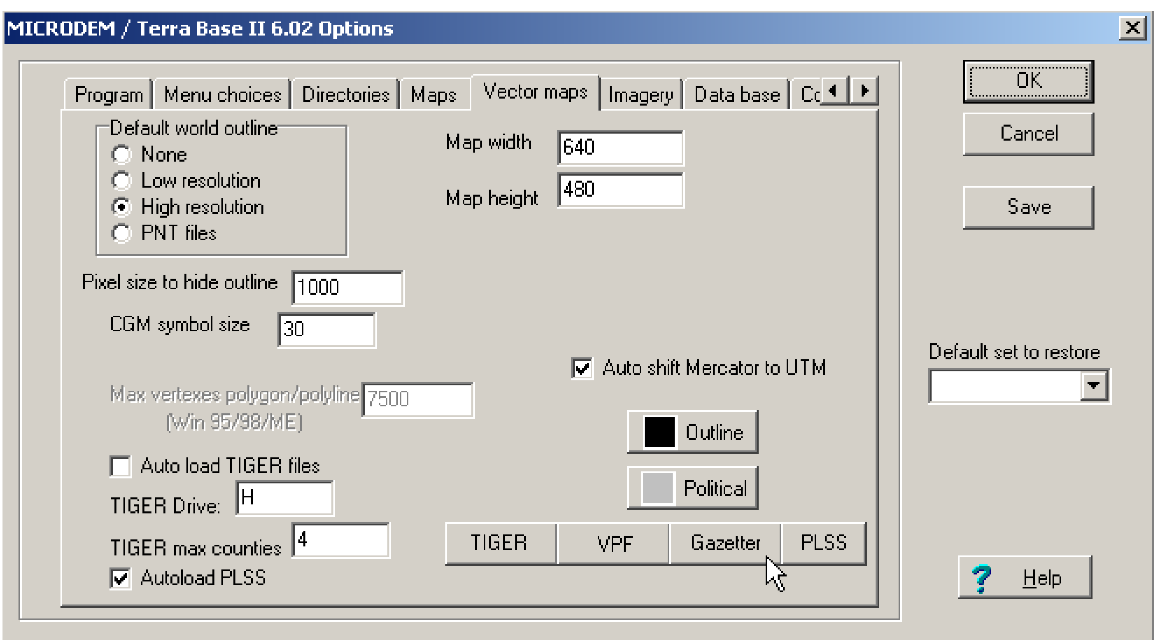
In the Data Manipulation menu select CREATE / USGS GAZETTEER DATABASE

NOTE: Users of DTED or NIMA Gazetteers will need to select NIMA GAZETTEER DATABASE from the menu.

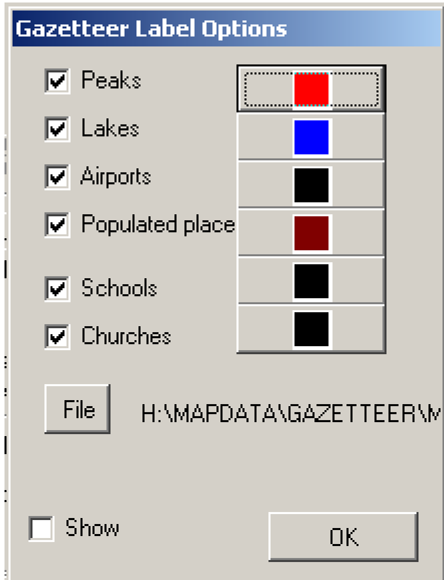


After you've converted your gazetteer files close the Data Manipulation interface.

Next go to the main menu select OPTIONS to bring up the OPTIONS interface.



Next click on the <GAZETTEER> button to bring up the Gazetteer Label Options.

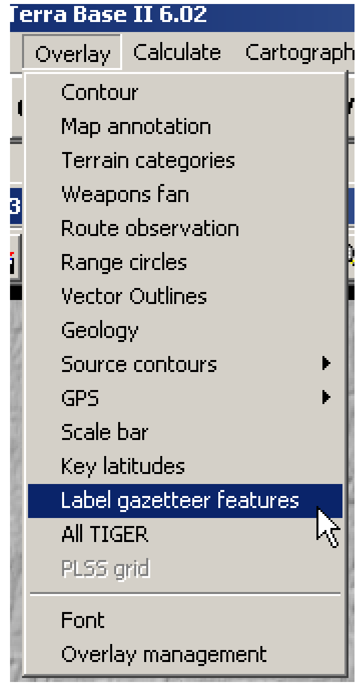


Here you select the desired features you wish to display by checking the appropriate boxes. Point and line symbology are very basic but you do have control of the color assigned to each feature type by clicking on the colored buttons on the right side of the interface.

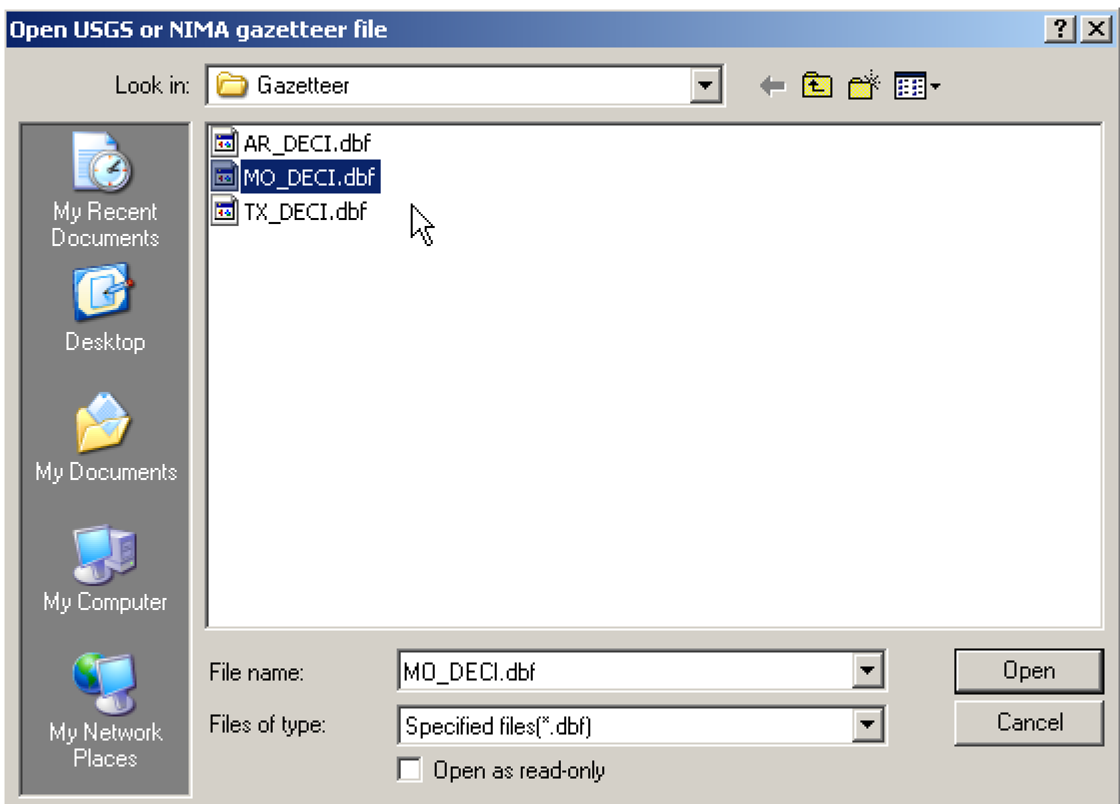
This will bring up the 'Color' interface where you click on the desired color and then close by clicking on the <OK> button.

Click on the <OK> button to close the Gazetteer Label Options interface and again to close the Options interface.

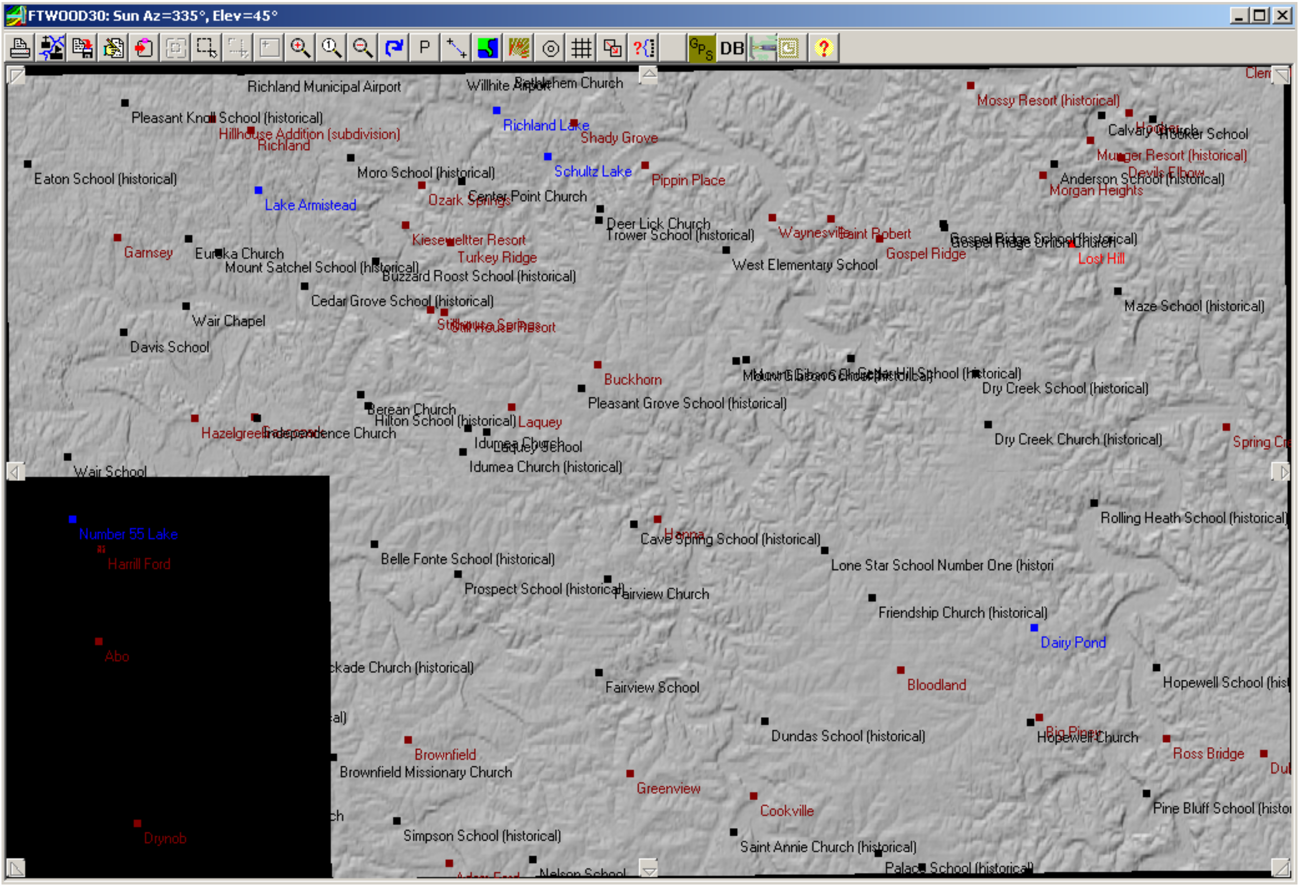
Gazetter data may be displayed over the world vector map, elevation data, scanned map data or imagery. As with any other (.DBF) file there are several different ways to display the data, each having their own advantages and disadvantages. Once you've opened your background map display go to the main menu and select OVERLAY / LABEL GAZETTEER FEATURES.



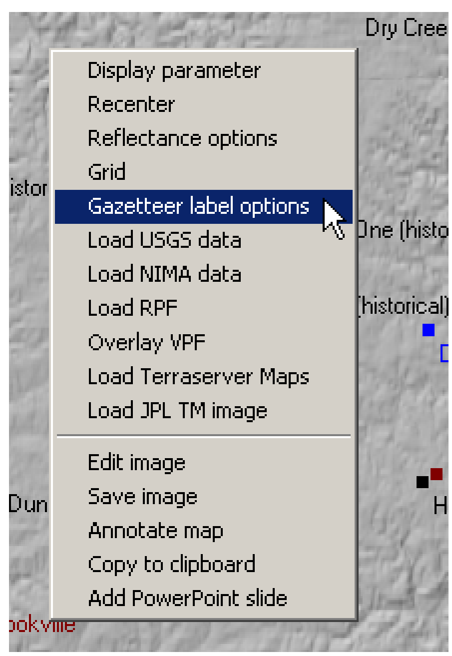
This will bring up the 'Open USGS or NIMA Gazetteer File' interface where you select the desired .dbf file from those available in your ..\Mapdata\Gazetteer folder.



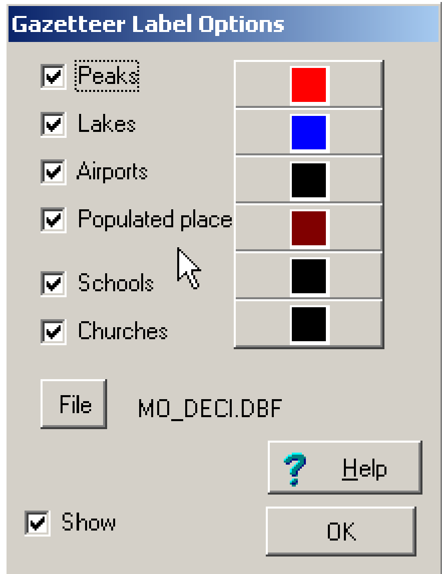
Here we select the Missouri gazetteer (MO_DECI.DBF) file to be displayed.



Here we have displayed the USGS 30 meter Digital Elevation Model (DEM) of the Fort Leonard Wood area with the Missouri Gazetteer overlay.



Right-mouse clicking on your display will bring up the pop-up menu. Here selecting GAZETTEER LABEL OPTIONS from the menu will bring up the Gazetteer Label Options interface.



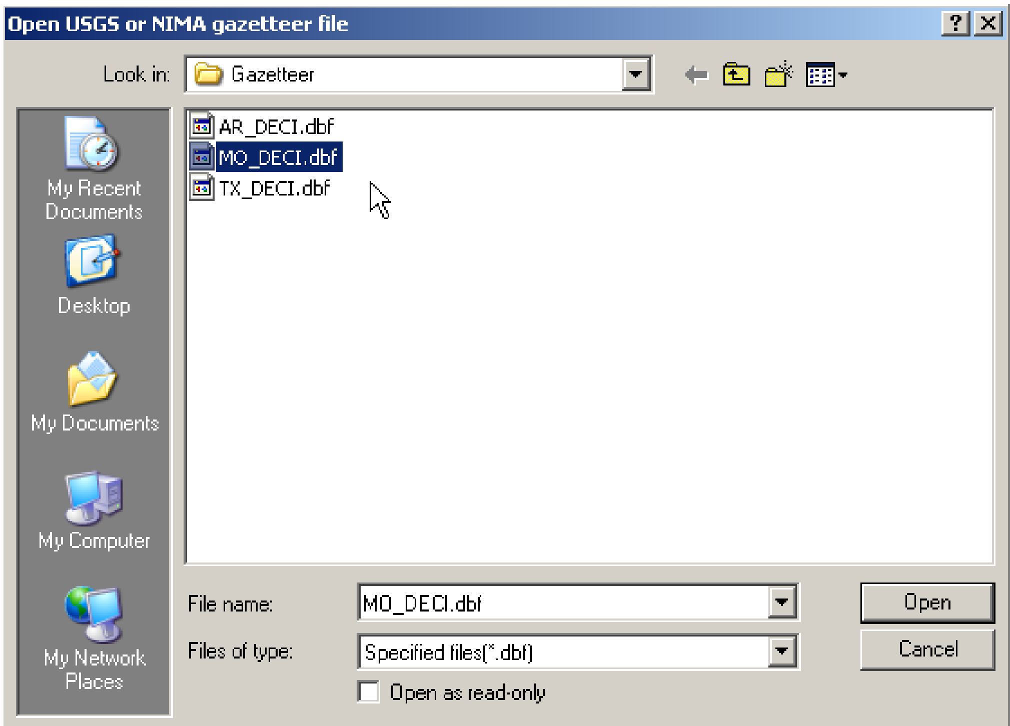
Here you can quickly deselect/select desired feature classes to be displayed or change colors of feature symbology.

The advantage of this method is that it will quickly plot the positions and names for features in your area of interest. This method also color codes the symbols and text for easy recognition.

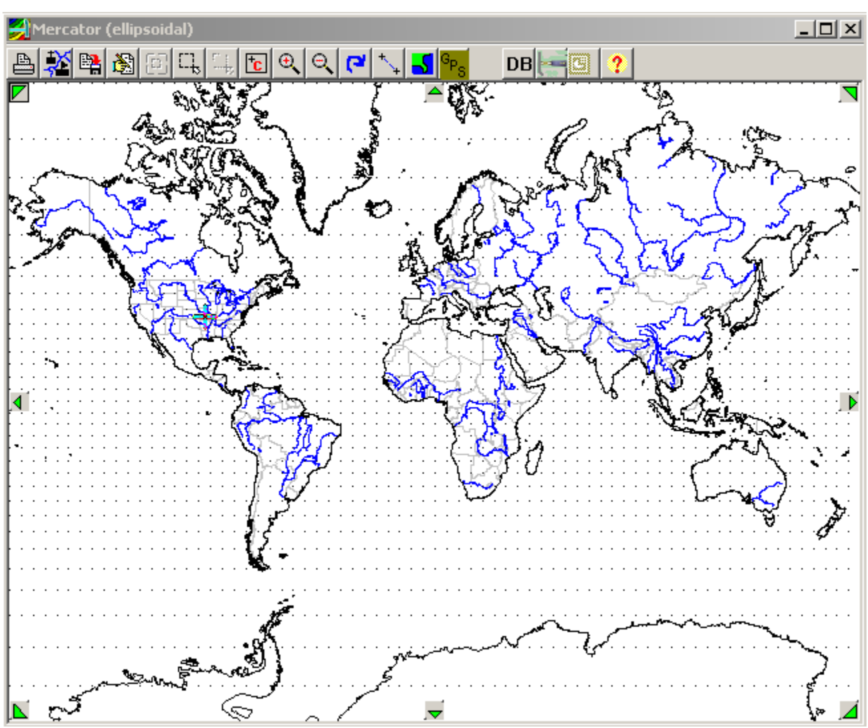
The disadvantage is that you have very little control over what is plotted on your display. Remember we had previously checked all the boxes for peaks, lakes, airports, populated places, schools and churches in the 'Gazetteer Label Options' interface.

What if you wanted to find a specific mountain, lake or school ? This is easy.

Simply click on the <GAZ> button at the main menu.
This will bring up the ‘Open USGS or NIMA
Gazetteer file.



Select the proper gazetteer (.dbf) file for your area. This will open the world vector map and the attribute table for the gazetteer .dbf file.

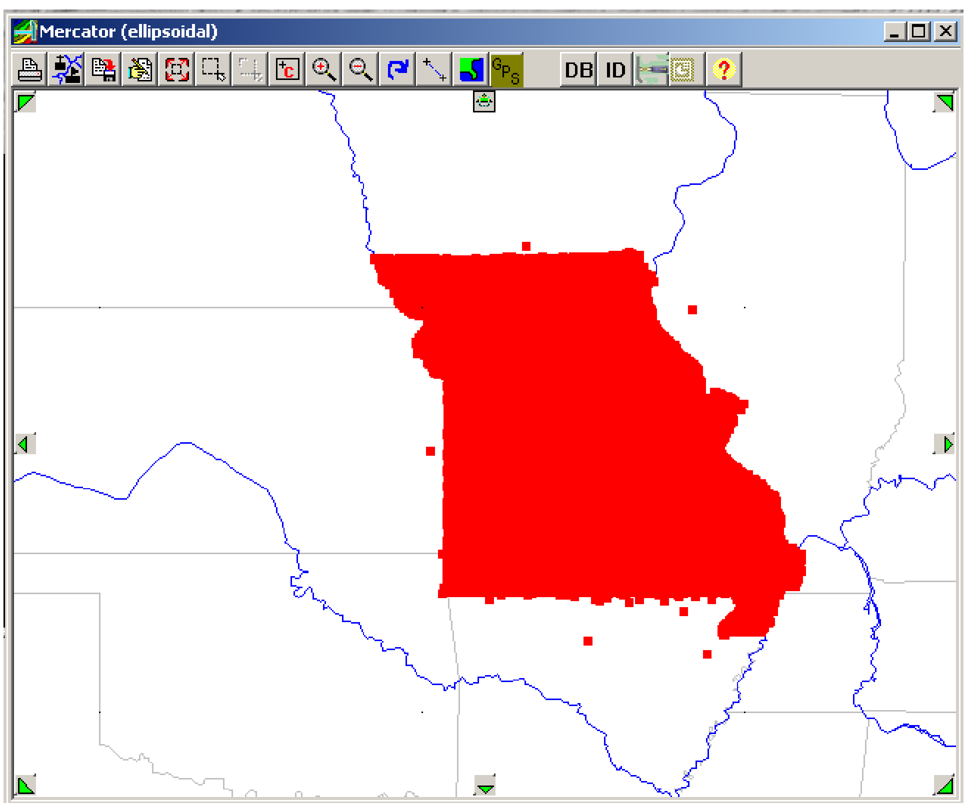


Data Base MO_DECI

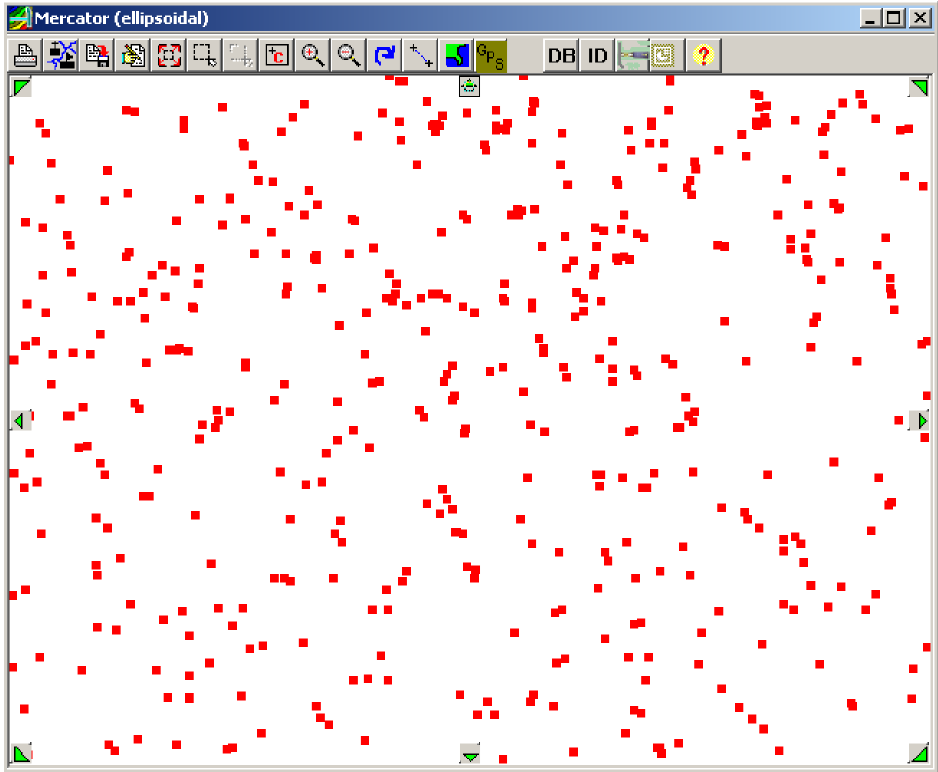
NAME	STATE	COUNTY	LAT	LONG	FEATURE	LAT2	LONG2
Alexander Farms Dam	MO	Pulaski	37.937545	-92.35167	dam		
Alexander Farms Lake	MO	Pulaski	37.937545	-92.35167	reservoir		
Anderson School (historical)	MO	Pulaski	37.84282	-92.09	school		
Antioch Cemetery	MO	Pulaski	37.915876	-92.20917	cemetery		
Armistead Dam	MO	Pulaski	37.837534	-92.40167	dam		
Assembly of God Church	MO	Pulaski	37.920305	-92.2575	church		
Bailey (historical)	MO	Pulaski	37.685026	-92.19639	locale		
Bald Ridge Creek	MO	Pulaski	37.656413	-92.07056	stream		
Baldridge (historical)	MO	Pulaski			locale		
Baldridge School (historical)	MO	Pulaski	37.623364	-92.10278	school		
Ballard Hollow	MO	Pulaski	37.776408	-92.16472	valley		
Barlow Creek	MO	Pulaski	37.796683	-92.39	stream		
Bartlett Cemetery	MO	Pulaski	37.846118	-92.25028	cemetery		
Bartlett Springs (historical)	MO	Pulaski			locale		
Bates School	MO	Pulaski	37.949732	-92.21889	school		
Bear Ridge	MO	Pulaski			ridge		
Bear Ridge School	MO	Pulaski	37.870559	-92.24889	locale		
Bell Branch	MO	Pulaski	37.743337	-92.38417	stream		

Records displayed: 389

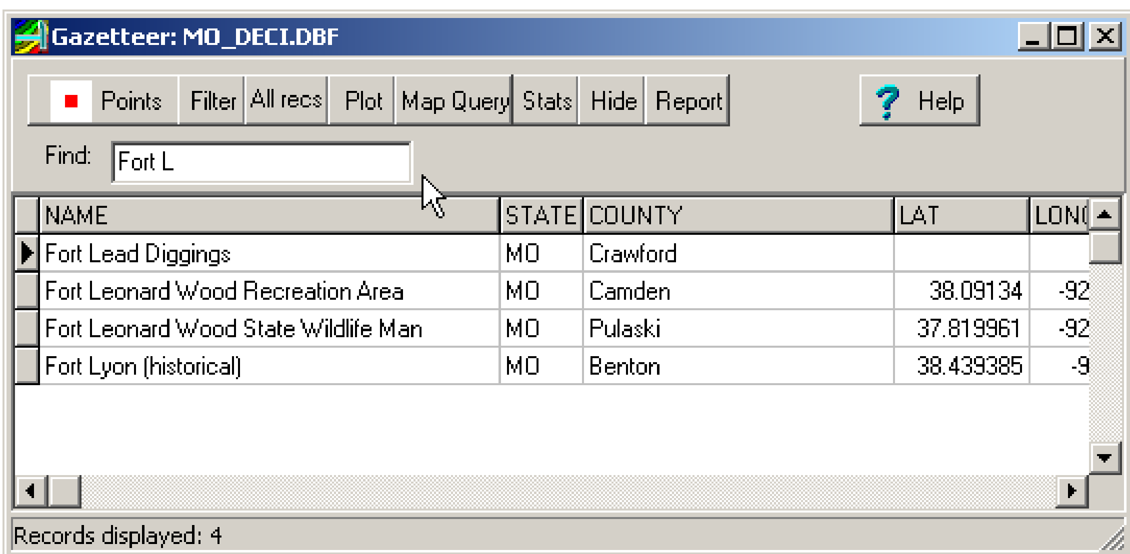
The attribute table data for our Missouri gazetteer file.



We can zoom-in to see the location of the data relative to the state.

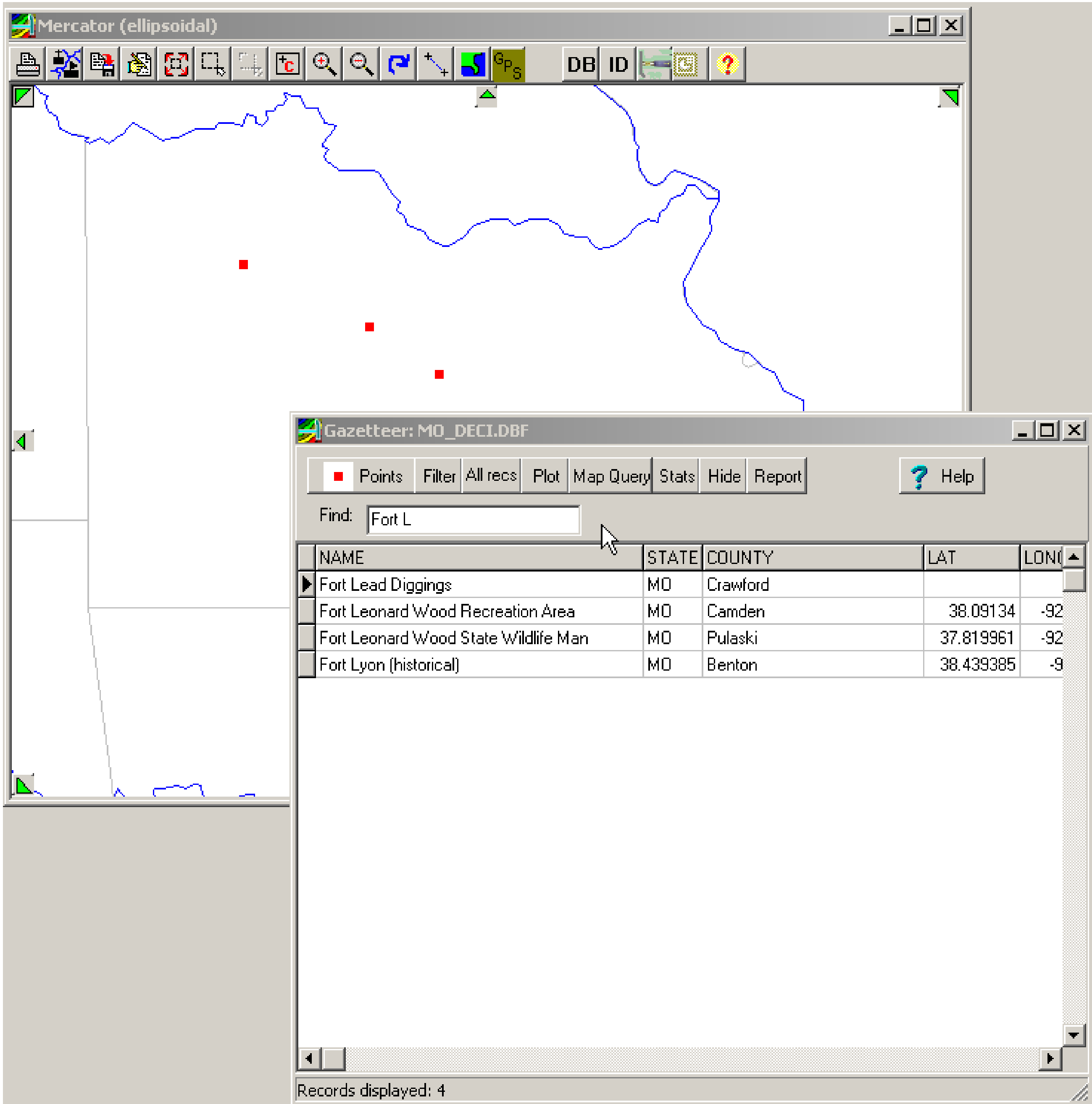


We can zoom in further to see the individual feature symbols .



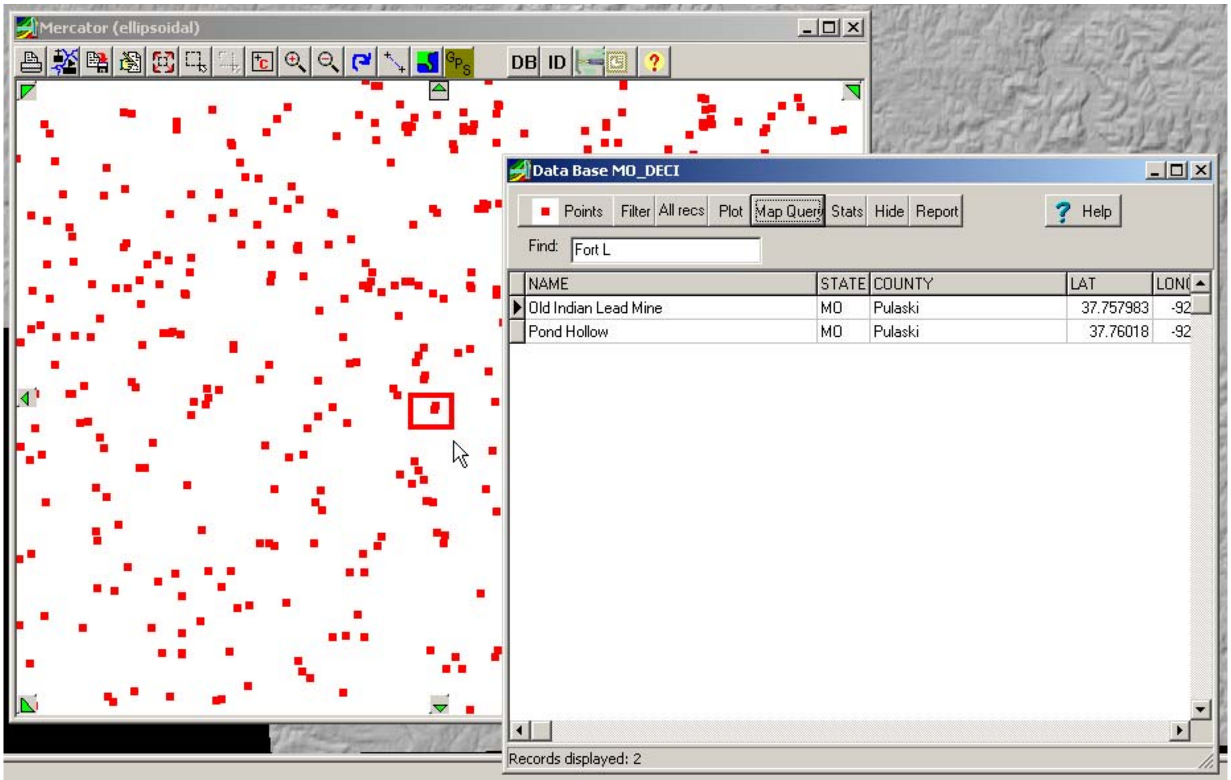
NAME	STATE	COUNTY	LAT	LON(
Fort Lead Diggings	MO	Crawford		
Fort Leonard Wood Recreation Area	MO	Camden	38.09134	-92
Fort Leonard Wood State Wildlife Man	MO	Pulaski	37.819961	-92
Fort Lyon (historical)	MO	Benton	38.439385	-9

By typing in the FIND: data entry field as shown above you can quickly limit the number records displayed in your table and on the map. NOTE: This feature applies only to the NAME character field of the .dbf file.



Here we have narrowed the display down to only five records whose names begin with “Fort L’.

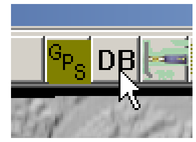
There are many other functions available from the attribute table menu. Most have been covered in earlier sections of the manual but we will cover a few more just to refresh your memory.

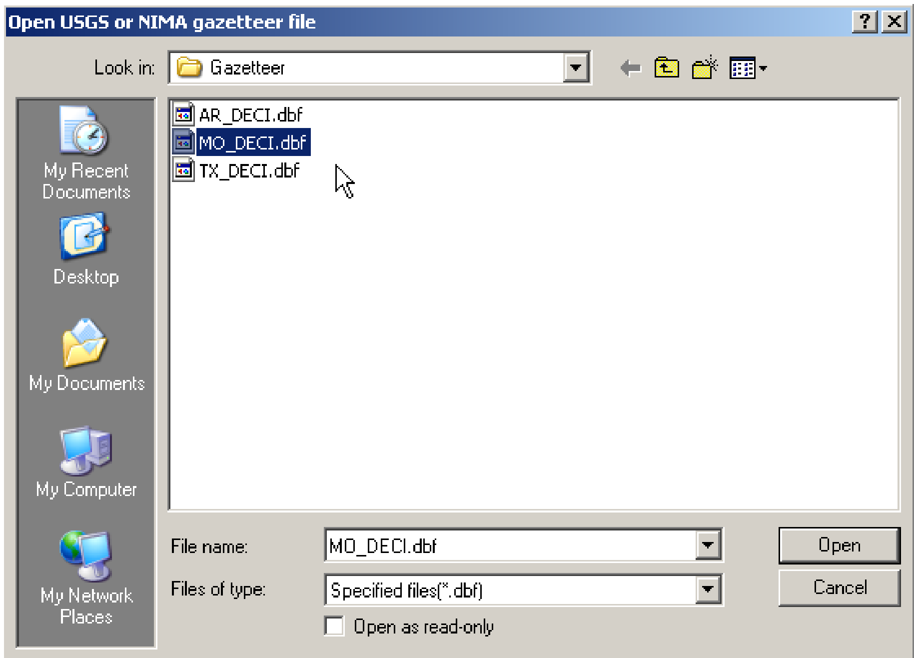


You can identify individual features or groups of features by performing a MAP QUERY from the attribute table menu. Click on the <Map Query> button and then click and hold the left mouse button on to the north-west and drag to the south-east and then release the mouse button. This will select the features within the box; the associated records are then displayed in the attribute table.

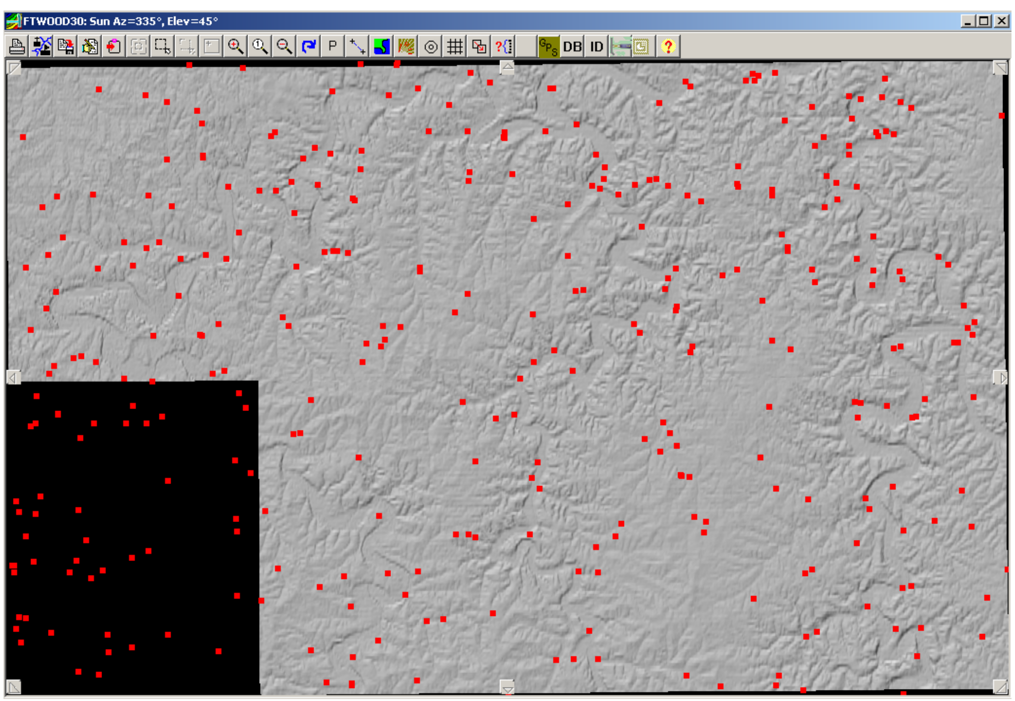
The disadvantages of this method are that you cannot display the data over your own map and you can't take advantage of many of the PLOT and FILTER functions normally available with .dbf files.

Another way to display the gazetteer data over your own map background is to click on the <DB> button on the display GUI bar. This will open the 'Open USGS or NIMA Gazetteer File' interface.



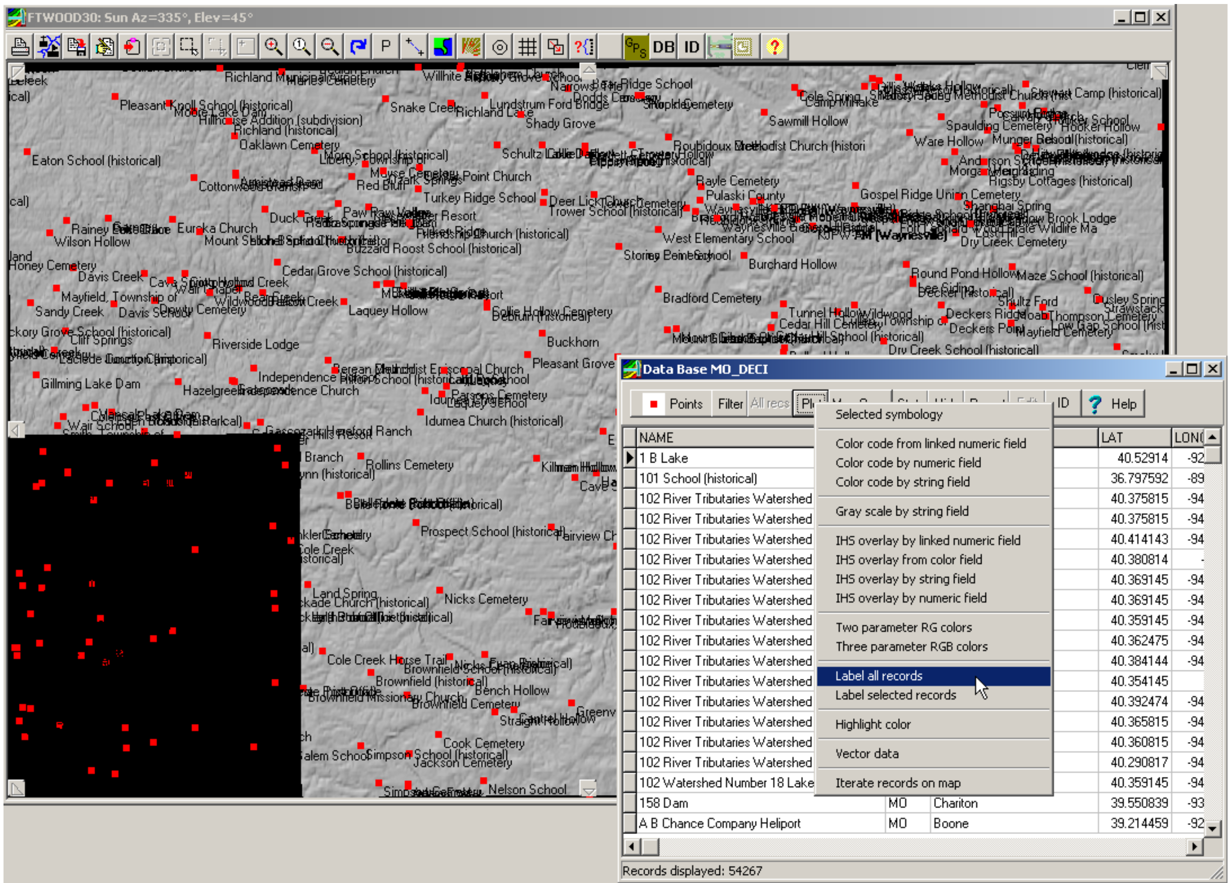


Select the proper gazetteer .dbf file for your area.

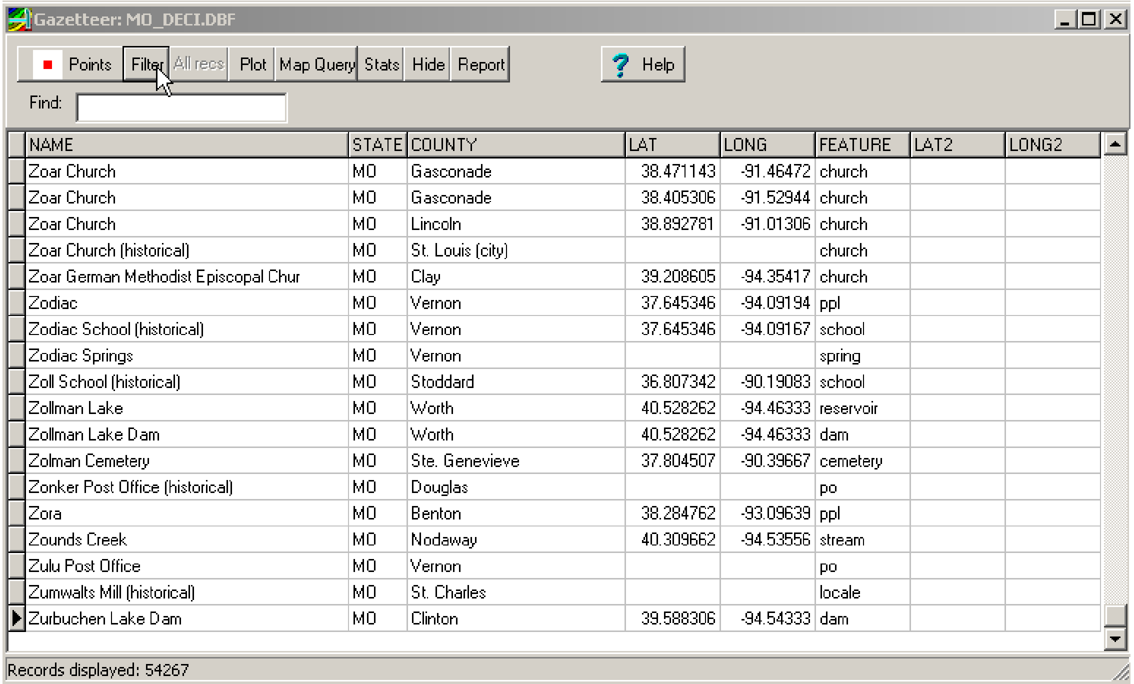


This will display the symbols and locations for the features over your current map background and open the attribute table for the chosen file.

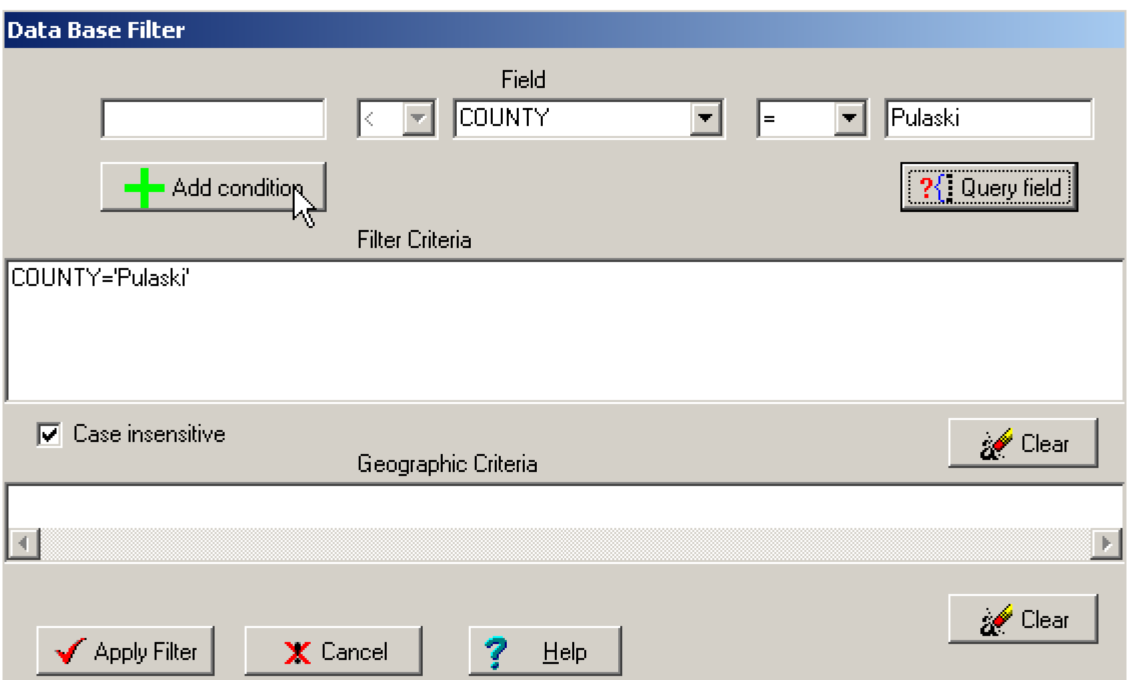
We can label our features by selecting PLOT / LABEL ALL RECORDS from the attribute table menu.



Opening your gazetteer .dbf file with this method gives you greater control over what records are displayed through a greater range of functions available from the attribute table menu. Again most of these functions have been covered in earlier sections of the manual but we will cover one more useful function in the next section.

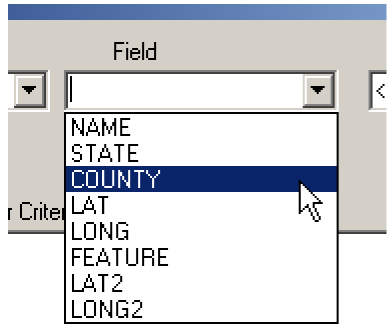


Clicking on the <FILTER> button on the attribute table will bring up the ‘ Data Base Filter’ interface.



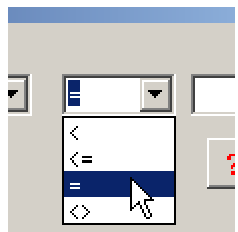
This interface provides great flexibility in performing searches through your .dbf files. Here we will perform a simple search of the ‘County’ field for all ‘Pulaski’ entries.

We click on the Field 'down arrow' to bring up the list of available fields for the data and select 'county'.

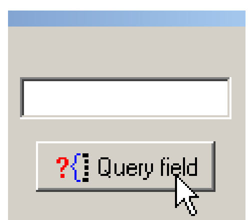


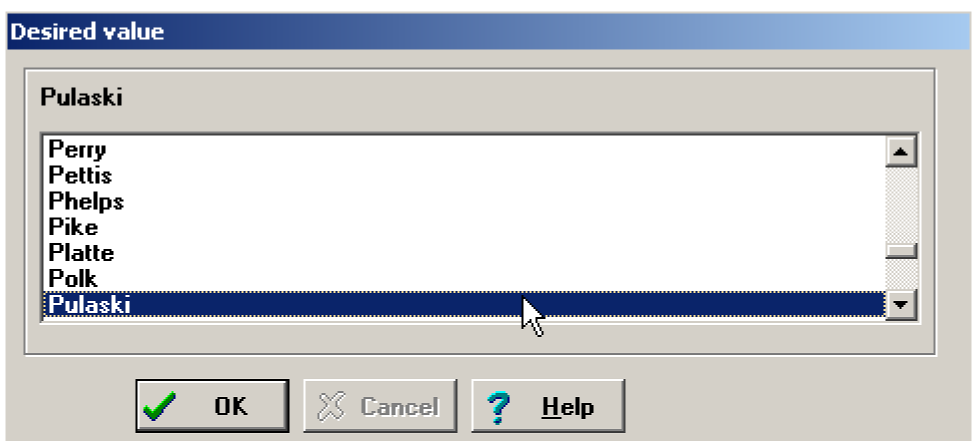
We then click on the Boolean Logic 'down arrow' to select the desired operator for our search.

Here we have selected the 'equals' sign.



We then click on the <Query Field> button to bring up the 'Desired Value' selection.

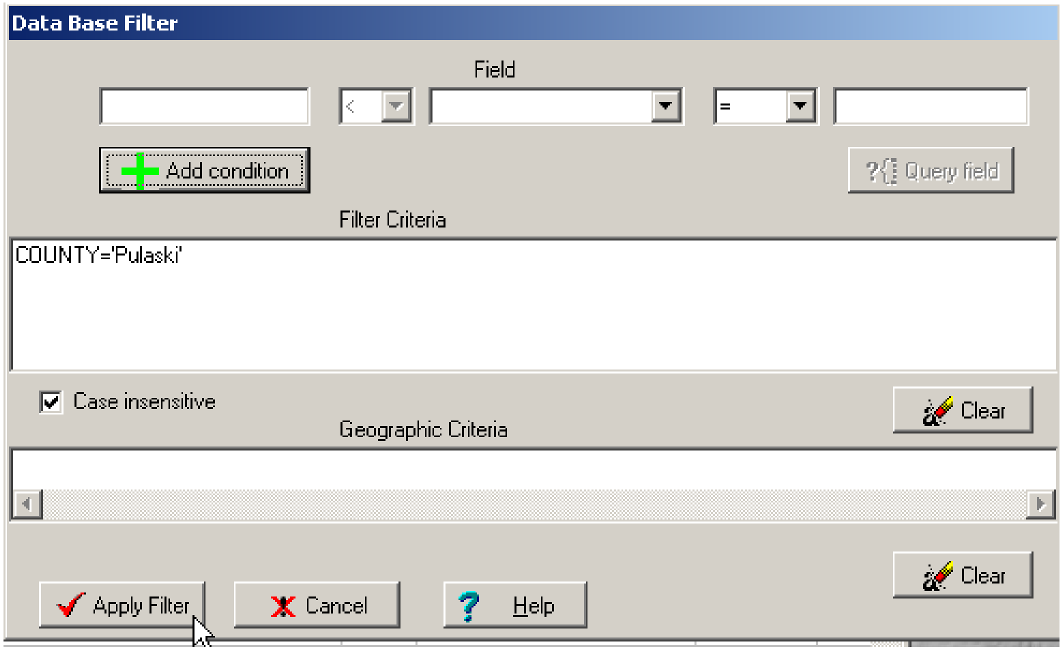




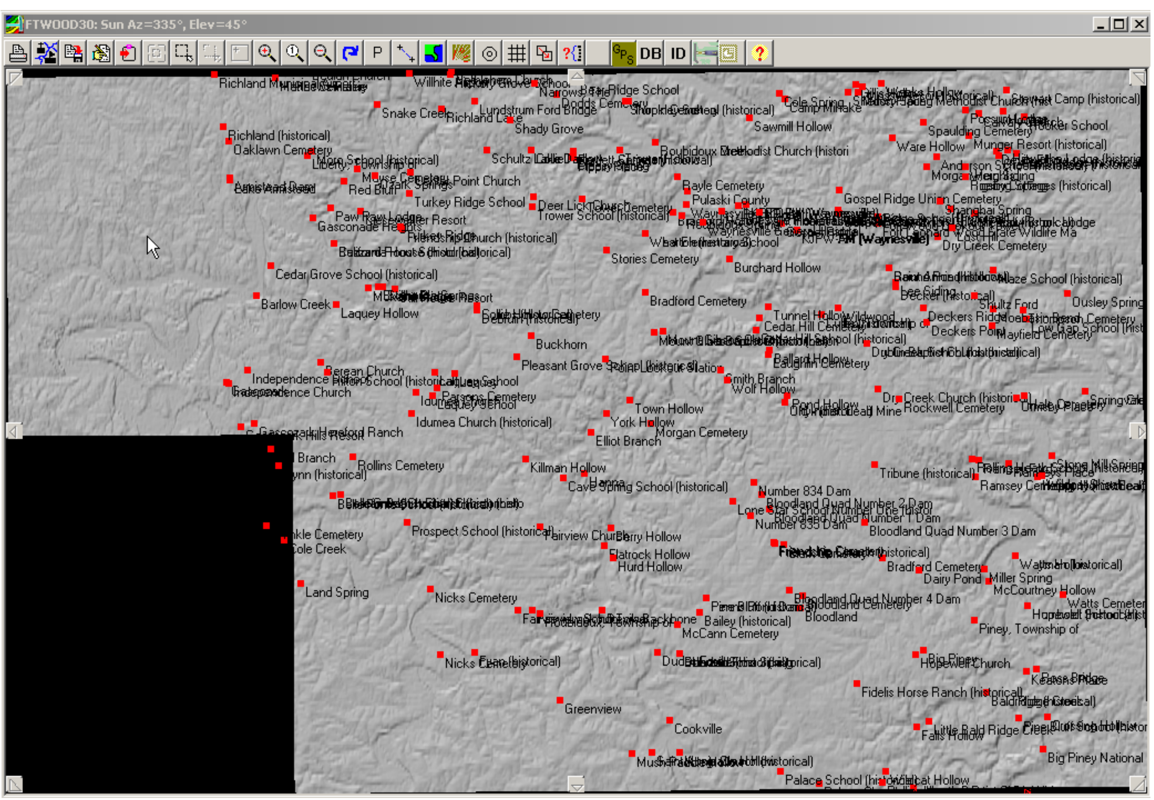
Here we select 'Pulaski' from the list of county names.

The next step is to click on the <ADD CONDITION> button.

NOTE: Although we have entered only one simple search condition, the interface allows you to build complex search conditions. The interface also allows you to enter more than one condition at the same time. The resulting ‘filtered’ data must meet all the conditions entered in the ‘Filter Criteria’ field.



The final step is to click on the <APPLY FILTER> button.



As you can see in the previous picture the records which fall-in Laclede County have been removed from the left side of the display, only those records falling in Pulaski County are displayed.

NOTE: This method will only redisplay the symbology and location of the filter results; you will need to re-label the data using the PLOT / LABEL ALL RECORDS function.

This concludes the Addendum to the User's Guide for MicroDEM 6.03. We hope that you find the software and this manual useful and relatively easy to use.